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=> d his nofile

     FILE 'LCA' ENTERED AT 12:06:53 ON 08 NOV 2002
L1                QUE ABB=ON  PLU=ON  APPARAT? OR INSTRUMENT? OR TOOL? OR
                  EQUIPMENT?
L2           1939 SEA ABB=ON  PLU=ON  PLASMA OR PECVD OR PACVD OR ULPCVD OR PCVD
                  OR (PA OR PE OR ULP OR P)(2W)CVD
L3            454 SEA ABB=ON  PLU=ON  PUMP?
L4           1114 SEA ABB=ON  PLU=ON  EXHAUST? OR OUTFLOW? OR DISCHARG? OR
                  OUTPOUR? OR EFFLUENC? OR EFFUSION? OR RUNOFF? OR EFFLUX?
L5                QUE ABB=ON  PLU=ON  GAS## OR GASEOUS? OR VAPOR? OR VAPOUR? OR
                  DISCHARG? OR EMISSION? OR OFFGAS## OR EMANAT?
L6           3793 SEA ABB=ON  PLU=ON  SUPPL? OR INJECT? OR INTRODUC? OR NOZZL?
                  OR JET OR JETS OR SYRING? OR NEEDL?
L7            274 SEA ABB=ON  PLU=ON  COIL? OR SPIRAL? OR HELIX? OR GYRE? OR
                  SWIRL?
L8           4421 SEA ABB=ON  PLU=ON  CONTROL? OR MICROCONTROL? OR MICROPROCES?
                  OR MICRO(2W)(CONTROL? OR PROCES?) OR CPU#
L9           8690 SEA ABB=ON  PLU=ON  PRESSUR? OR P
L10               QUE ABB=ON  PLU=ON  (TWO OR DUAL? OR DOUBL? OR (MORE OR
                  GREAT###)(3W)ONE# OR SEVERAL? OR PAIR#)
L11          5577 SEA ABB=ON  PLU=ON  COOL? OR CHILL? OR (LOW###### OR DECREAS?
                  OR REDUC?)(3A)(TEMPERATUR?) OR REFRIG? OR (HEAT#(W)TRANSFER?
                  OR EXCHANG?) OR CRYOGEN? OR (LIQUID? OR LIQUEF?)(3A)(NITROGEN#
                  OR N2 OR N OR HELIUM# OR HE)
L12         10067 SEA ABB=ON  PLU=ON  SUBSTRAT? OR SURFACE? OR BASE# OR SUBSTRUCT
                  ? OR UNDERSTRUCTUR? OR UNDERLAY?
L13          1154 SEA ABB=ON  PLU=ON  EXHAUST? OR OUTFLOW? OR DISCHARG? OR
                  OUTPOUR? OR EFFLUENC? OR EFFUSION? OR RUNOFF? OR EFFLUX? OR
                  PORT#
L14           301 SEA ABB=ON  PLU=ON  HOUSING? OR SHROUD? OR JACKET? OR TRACK?
                  OR ENCAS? OR RUT## OR GROOV####
L15          1459 SEA ABB=ON  PLU=ON  ELECTROD?
L16            16 SEA ABB=ON  PLU=ON  ANTENNA?

     FILE 'STNGUIDE' ENTERED AT 12:34:50 ON 08 NOV 2002

     FILE 'HCAPLUS' ENTERED AT 12:41:38 ON 08 NOV 2002
L17        706764 SEA ABB=ON  PLU=ON  PLASMA OR PECVD OR PACVD OR ULPCVD OR PCVD
                  OR (PA OR PE OR ULP OR P)(2W)CVD
L18        172997 SEA ABB=ON  PLU=ON  PUMP?
L19        421017 SEA ABB=ON  PLU=ON  EXHAUST? OR OUTFLOW? OR DISCHARG? OR
                  OUTPOUR? OR EFFLUENC? OR EFFUSION? OR RUNOFF? OR EFFLUX?
L20        436200 SEA ABB=ON  PLU=ON  EXHAUST? OR OUTFLOW? OR DISCHARG? OR
                  OUTPOUR? OR EFFLUENC? OR EFFUSION? OR RUNOFF? OR EFFLUX? OR
                  PORT#
L21               QUE ABB=ON  PLU=ON  GAS## OR GASEOUS? OR VAPOR? OR VAPOUR? OR
                  DISCHARG? OR EMISSION? OR OFFGAS## OR EMANAT?
L22               QUE ABB=ON  PLU=ON  SUPPL? OR INJECT? OR INTRODUC? OR NOZZL?
                  OR JET OR JETS OR SYRING? OR NEEDL?
L23        159016 SEA ABB=ON  PLU=ON  COIL? OR SPIRAL? OR HELIX? OR GYRE? OR
                  SWIRL?
L24          5782 SEA ABB=ON  PLU=ON  COIL?(3A)(SPIRAL? OR ROUND? OR WOUND? OR
                  HELIX OR GYRE? OR SWIRL?)
L25               QUE ABB=ON  PLU=ON  CONTROL? OR MICROCONTROL? OR MICROPROCES?
                  OR MICRO(2W)(CONTROL? OR PROCES?) OR CPU#
L26               QUE ABB=ON  PLU=ON  PRESSUR? OR P
L27               QUE ABB=ON  PLU=ON  TWO OR DUAL? OR DOUBL? OR (MORE OR
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                GREAT###)(3W)(ONE# OR SEVERAL? OR PAIR#) OR AUXIL? OR ANCILLAR?
                 OR ADDITION? OR SUPPLEMENT? OR ANOTHER?
L28             QUE ABB=ON  PLU=ON  COOL? OR CHILL? OR (LOW###### OR DECREAS?
                OR REDUC?)(3A)(TEMPERATUR?) OR REFRIG? OR (HEAT#(W)TRANSFER?
                OR EXCHANG?) OR CRYOGEN? OR (LIQUID? OR LIQUEF?)(3A)(NITROGEN#
                OR N2 OR N OR HELIUM# OR HE)
L29             QUE ABB=ON  PLU=ON  SUBSTRAT? OR SURFACE? OR BASE# OR SUBSTRUCT
                ? OR UNDERSTRUCTUR? OR UNDERLAY?
L30             QUE ABB=ON  PLU=ON  L29 OR SEAT?
L31      153372 SEA ABB=ON  PLU=ON  HOUSING? OR SHROUD? OR JACKET? OR TRACK?
                OR ENCAS? OR RUT#### OR GROOV####
L32      565141 SEA ABB=ON  PLU=ON  ELECTROD?
L33       13796 SEA ABB=ON  PLU=ON  ANTENNA?
L34             QUE ABB=ON  PLU=ON  APPARAT? OR INSTRUMENT? OR TOOL? OR
                EQUIPMENT?
L35       37471 SEA ABB=ON  PLU=ON  L34 AND L17
L36          55 SEA ABB=ON  PLU=ON  L35 AND L18(3A)L19
L37       74629 SEA ABB=ON  PLU=ON  L21(3A)L22
L38          12 SEA ABB=ON  PLU=ON  L36 AND L37
L39           1 SEA ABB=ON  PLU=ON  L38 AND L23
                D SCAN
L40        4165 SEA ABB=ON  PLU=ON  L18(3A)L19
L41       35697 SEA ABB=ON  PLU=ON  L27(3A)L22
L42        1403 SEA ABB=ON  PLU=ON  L41(4A)(GAS## OR GASEOUS? OR VAPOR? OR
                VAPOUR?)
L43          24 SEA ABB=ON  PLU=ON  L35 AND L42
                D L43 1 CBIB ABS HITIND
                D L43 2 CBIB ABS HITIND
L44        1121 SEA ABB=ON  PLU=ON  L41(2A)(GAS? OR VAPOR? OR VAPOUR?)
L45          17 SEA ABB=ON  PLU=ON  L35 AND L44
                D L45 1 CBIB ABS HITIND
                D L45 2 CBIB ABS HITIND
                D L45 3 CBIB ABS HITIND
L46           3 SEA ABB=ON  PLU=ON  L38 AND L25
L47           5 SEA ABB=ON  PLU=ON  L45 AND L25
                D SCAN L47
L48         852 SEA ABB=ON  PLU=ON  L27(2A)L22(2A)(GAS? OR VAPOR? OR VAPOUR?
                OR MIST?)
L49          12 SEA ABB=ON  PLU=ON  L35 AND L48
L50           5 SEA ABB=ON  PLU=ON  L49 AND L25
L51             QUE ABB=ON  PLU=ON  TWO OR DUAL? OR DOUBL? OR 2ND OR (MORE OR
                GREAT###)(3W)(ONE# OR SEVERAL? OR PAIR#) OR AUXIL? OR ANCILLAR?
                                  OR ADDITION? OR SUPPLEMENT? OR ANOTHER?
L52       41548 SEA ABB=ON  PLU=ON  L51(3A)L22
L53          12 SEA ABB=ON  PLU=ON  L49 AND L52
L54      197772 SEA ABB=ON  PLU=ON  (CREAT? OR MAKE? OR MADE? OR INDUC?)(3A)VAC
                UUM? OR (REDUC? OR LOWER? OR DECREAS?)(3A)(PRESSUR? OR P)
                D COST

      FILE 'LCA' ENTERED AT 13:19:54 ON 08 NOV 2002
L55             QUE ABB=ON  PLU=ON  TWO OR DUAL? OR 2ND OR SECOND? OR TWIN? OR
                DOUBL? OR (MORE OR GREAT###)(3W)ONE# OR SEVERAL? OR PAIR# OR
                AUXIL? OR ANCILLAR? OR ADDITION? OR SUPPLEMENT? OR ANOTHER?
L56         560 SEA ABB=ON  PLU=ON  (CREAT? OR MAKE? OR MADE? OR INDUC? OR
                MEANS)(3A)VACUUM? OR (REDUC? OR LOWER? OR DECREAS?)(3A)(PRESSUR
                ? OR P)

      FILE 'HCAPLUS' ENTERED AT 13:39:06 ON 08 NOV 2002
L57        3522 SEA ABB=ON  PLU=ON  L55(3A)L56
L58          13 SEA ABB=ON  PLU=ON  L57 AND L35
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L59            1 SEA ABB=ON  PLU=ON  L58 AND L37
L60            2 SEA ABB=ON  PLU=ON  L58 AND L25
L61            0 SEA ABB=ON  PLU=ON  L58 AND L23
L62         6210 SEA ABB=ON  PLU=ON  L23(3A)(L29 OR SIT? OR REST? OR SEAT?)
L63         1576 SEA ABB=ON  PLU=ON  L23(3A)L31
L64           47 SEA ABB=ON  PLU=ON  L35 AND L62
L65            6 SEA ABB=ON  PLU=ON  L35 AND L63
                 D SCAN
                 D L65 1 CBIB ABS HITIND
                 D L65 2 CBIB ABS HITIND
                 D L65 3 CBIB ABS HITIND
                 D L64 1 CBIB ABS HITIND
L66        37825 SEA ABB=ON  PLU=ON  (SURFACE? OR BASE# OR SUBSTRUCT? OR
                 UNDERSTRUCTUR? OR UNDERLAY?)(3A)(SIT? OR REST? OR SEAT?)
L67           29 SEA ABB=ON  PLU=ON  L66(2A)L23
L68            0 SEA ABB=ON  PLU=ON  L35 AND L67
L69            1 SEA ABB=ON  PLU=ON  L67 AND L37
L70            3 SEA ABB=ON  PLU=ON  L67 AND L25
L71            1 SEA ABB=ON  PLU=ON  L67 AND L32
L72            0 SEA ABB=ON  PLU=ON  L67 AND L33
L73            0 SEA ABB=ON  PLU=ON  L64 AND L33
L74            2 SEA ABB=ON  PLU=ON  L36 AND L32
L75            3 SEA ABB=ON  PLU=ON  L36 AND L33
L76         1169 SEA ABB=ON  PLU=ON  L35 AND L4(3A)(GAS OR VAPOR? OR VAPOUR? OR
                 MIST)
L77            0 SEA ABB=ON  PLU=ON  L76 AND L63
L78            1 SEA ABB=ON  PLU=ON  L76 AND L62
                 D SCAN
L79           27 SEA ABB=ON  PLU=ON  L39 OR L46 OR L47 OR L46 OR L50 OR L59 OR
                 L60 OR L65 OR L69 OR L70 OR L71 OR L74 OR L75 OR L78
L80           37 SEA ABB=ON  PLU=ON  L38 OR L49 OR L53 OR L58
L81           24 SEA ABB=ON  PLU=ON  L80 NOT L79
L82            8 SEA ABB=ON  PLU=ON  L64 AND L28
L83            0 SEA ABB=ON  PLU=ON  L79 AND L28
L84            4 SEA ABB=ON  PLU=ON  L81 AND L28
L85           24 SEA ABB=ON  PLU=ON  L81 OR L84
L86         3534 SEA ABB=ON  PLU=ON  L35 AND L28
L87          276 SEA ABB=ON  PLU=ON  L86 AND L37
L88           61 SEA ABB=ON  PLU=ON  L87 AND L25
L89            3 SEA ABB=ON  PLU=ON  L88 AND L23
L90           30 SEA ABB=ON  PLU=ON  L79 OR L89

FILE 'JAPIO' ENTERED AT 14:11:11 ON 08 NOV 2002
L91         7253 S L35
L92         1957 S L91 AND L37
L93          377 S L92 AND L25
L94           61 S L93 AND L23
L95            5 S L94 AND L28
L96            3 S L93 AND L42
L97           11 S L94 AND 20
L98            9 S L93 AND L18(3N)(L19)
L99            2 S L94 AND L62
L100           0 S L94 AND L63
L101           0 S L93 AND L63
L102           0 S L94 AND L57
L103           0 S L93 AND L57
L104        6836 S L55(3N)L18
L105           1 S L93 AND L104
L106           6 S L92 AND L104
L107         937 S L92 AND L19
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L108         178 S L107 AND L25
L109          30 S L108 AND L23
L110          13 S L109 AND L32
L111           0 S L110 AND L33
L112           1 S L109 AND L33
L113          44 S L95 OR L96 OR L97 OR L98 OR L99 OR L105 OR L106 OR L110 OR L1
L114          24 S L95 OR L96 OR L98 OR L99 OR L105 OR L106 OR L112
L115          20 S (L97 OR L110) NOT L114

     FILE 'JAPIO' ENTERED AT 14:25:14 ON 08 NOV 2002

     FILE 'WPIX' ENTERED AT 14:26:28 ON 08 NOV 2002
L116       21407 S L35
L117        3856 S L116 AND L37
L118         890 S L117 AND L25
L119          91 S L118 AND L23
L120          21 S L119 AND L28
L121           2 S L120 AND 42
L122           8 S L120 AND L20
L123           1 S L120 AND L18(3N)L19
L124           5 S L120 AND L62
L125           1 S L120 AND L42
L126           0 S L120 AND L63
L127           2 S L119 AND L63
L128           1 S L119 AND L57
L129       27352 S L104
L130           1 S L119 AND L129
L131          32 S L119 AND L19
L132          32 S L131 AND L25
L133          32 S L132 AND L23
L134          12 S L133 AND L32
L135           0 S L134 AND L33
L136          28 S L121 OR L122 OR L123 OR L124 OR L125 OR L127 OR L128 OR L130

     FILE 'COMPENDEX, INSPEC' ENTERED AT 14:46:41 ON 08 NOV 2002
L137       23523 S L35
L138         426 S L137 AND L37
L139          18 S L138 AND L23
L140           1 S L139 AND L28
L141           1 S L139 AND L19(3N)L18
L142           0 S L139 AND L62
L143           0 S L139 AND L63
L144           0 S L139 AND L57
L145       12367 S L55(3N)L18
L146          56 S L137 AND L145
L147           3 S L146 AND L23
L148          19 S L146 AND L25
L149           2 S L148 AND L23
L150           2 S L148 AND L32
L151           1 S L148 AND L33
L152           8 S L140 OR L141 OR L147 OR L149 OR L150 OR L151
L153          14 S L148 NOT L152

FILE 'HCAPLUS' ENTERED AT 15:09:15 ON 08 NOV 2002
L154        4165 S L18(3N)L19
L155          55 S L35 AND L154
L156           8 S L90 AND L154
L157           6 S L85 AND L154
L158          14 S L156 OR L157
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FILE 'JAPIO' ENTERED AT 15:13:00 ON 08 NOV 2002
L159 11342 S L113 OR L154
L160 9 S L113 AND L154
L161 9 S L114 AND L154

FILE 'WPIX' ENTERED AT 15:13:58 ON 08 NOV 2002
L162 1 S L136 AND L154
L163 47 S L117 AND L154
L164 16 S L163 AND L25

FILE 'HCAPLUS' ENTERED AT 15:13:48 ON 08 NOV 2002

d L90 1-30 cbib abs hitind

L90 ANSWER 1 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2002:794017 Document No. 137:287692 Vacuum-chamber **apparatus** with gas-flow **control** for **plasma** processing of semiconductor-wafer substrates. Tetsuhiro, Iwai; Furukawa, Ryota (Japan). U.S. Pat. Appl. Publ. US 2002148561 A1 20021017, 9 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-118244 20020409. PRIORITY: JP 2001-113691 20010412.

AB The chamber **app.** for **plasma** processing is equipped with gas-flow **control** to prevent excessive surge of processing gas during an initial flow stage. The gas-flow process is **controlled** by using the **controller** flow-rate setting signal preset for "zero flow" prior to opening the gas shut-off valve which opens and closes the **gas supply**, and **another** flow-rate signal set for "specific flow rate" only after the gas shut-off valve is opened. The time from applied vacuum to the start of **plasma** discharge in the chamber is decreased for faster processing.

IC ICM C23F001-00
ICS C23C016-00
NCL 156345260
CC 76-11 (Electric Phenomena)
ST **plasma** processing chamber gas flow **control**; semiconductor processing chamber **plasma** gas flow **control**
IT **Plasma**
(chamber; vacuum-chamber **app.** with gas-flow **control** for **plasma** processing initiation)
IT Semiconductor device fabrication
(**plasma** processing for; vacuum-chamber **app.** with gas-flow **control** for **plasma** processing initiation)
IT Process **control**
(**plasma** treatment; vacuum-chamber **app.** with gas-flow **control** for **plasma** processing initiation)
IT Process **control**
(**plasma** treatment; vacuum-chamber **app.** with gas-flow **control** for **plasma** processing initiation)

L90 ANSWER 2 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2002:754920 Document No. 137:271808 Stacked rf excitation coil for inductive **plasma** processor. Chen, Jian J.; Veltrop, Robert G.; Wicker, Thomas E. (USA). U.S. Pat. Appl. Publ. US 2002140359 A1 20021003, 15 pp. (English). CODEN: USXXCO. APPLICATION: US 2001-821752 20010330.

AB A radio frequency excitation coil of an inductive **plasma** processor includes a planar turn connected in series with a segment of the coil stacked above a portion of the planar turn. The stacked segment is placed around a region having weak radio frequency coupling to **plasma** due to azimuthal asymmetries in the chamber and/or the

excitation coil. In a single winding embodiment, the stacked segment is close to an interconnection gap between 2 adjacent planar turns and extends in both directions from the gap to compensate low radio frequency coupling to **plasma** in the gap region. In an embodiment including 2 elec. parallel spatially concentric windings, the stacked segment extends beyond one side of an interconnection gap of 2 adjacent turns, and is aligned with the planar turn such that one end of the stacked segment is directly connected to an end of the planar turn via a straight, short stub. Terminals of the coil are connected to RF excitation circuitry terminals in a **housing** above the **coil** by leads extending smoothly and gradually without sharp bends between the coil terminals and the excitation circuitry terminals. Ends of the planar turn and the stacked segment are connected by a lead extending smoothly and gradually without sharp bends between its ends.

IC ICM C23C016-00
ICS C23F001-00
NCL 315111210
CC 76-11 (Electric Phenomena)
ST excitation coil inductive **plasma** processor
IT Vapor deposition **apparatus**
(**plasma**, vacuum **plasma** workpiece processor; stacked rf excitation coil for inductive **plasma** processor)
IT Coils
(stacked rf excitation coil for inductive **plasma** processor)
IT Coils
(stacked rf excitation coil for inductive **plasma** processor)

L90 ANSWER 3 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2002:650185 Document No. 137:178384 Thin-film vapor deposition by cathode arc discharging in detecting and controlling arc position. Nakatsu, Osamu; Takami, Yoshio (Shimazu Corporation, Japan). Jpn. Kokai Tokkyo Koho JP 2002241927 A2 20020828, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-43598 20010220.

AB The title deposition **app**. provides generation of arc discharge between an cathodic target and an anode to generate **plasma** beam contg. target ions and depositing the **plasma** beam as a target-material thin film on a substrate. The position of the arc on the target is detected by means of a magnetic field generated in arc discharge and is controlled by means of magnetizing current into a position controlling **coil based** on the position detection signal. The arc position detecting-controlling system makes possible to give arc generation evenly distributed over the target. The title process are preferably applicable to carbon film deposition in manuf. of magnetic memory disks and magnetic heads.

IC ICM C23C014-24
CC 76-12 (Electric Phenomena)
Section cross-reference(s): 77
ST carbon **vapor** deposition cathode arc **discharge** target position control
IT Magnetic field
Plasma
Vapor deposition process
(thin-film vapor deposition by cathode arc discharging in detecting and controlling arc position)
IT Magnetic field
Plasma
Vapor deposition process
(thin-film vapor deposition by cathode arc discharging in detecting and controlling arc position)

L90 ANSWER 4 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2002:273147 Document No. 136:286905 High-frequency glow-discharge **plasma** treatment **apparatus** and method. Hojo, Yoshiyuki; Nakamura, Tsuneo (Sharp Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002110559 A2 20020412, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-298898 20000929.

AB In the **plasma** treatment by **supplying** a **gas** contg. an inert gas and a reactive gas, the pressure of a reaction chamber (P1) is **controlled** to be (P2 .ltoreq. P1 .ltoreq. P3; P2 = pressure wherein collision frequency of the inert gas radicals to each other becomes approx. the same as the frequency of the power source, P3 = pressure wherein collision frequency between the inert gas radicals and the reactive gas ions becomes approx. the same as the frequency of the powder source). The **plasma** treatment **app.** is equipped with a sensor for detecting the **supplement gas**, a **pump** for **discharging** inner gas, and a means of **controlling** the pressure of the reaction chamber by adjusting discharging amt. of the gas according to a signal from the sensor. The method achieves film deposition, etching, and ashing of resists at high speed and high inert gas utilization efficiency.

IC ICM H01L021-205
ICS B01J019-08; C23C016-24; C23C016-509; H01L021-3065; H05H001-46

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 74, 76

ST high frequency glow discharge **plasma** treatment **app**; film **plasma** deposition gas pressure **control**; etching **plasma** gas pressure **control**; resist **plasma** ashing gas pressure **control**; inert gas addn **plasma** treatment **app**

IT Resists
(**plasma** ashing; high-frequency glow-discharge **plasma** treatment **app**. and method by **controlling** pressure of **supplement gas** contg. inert **gas** and reactive gas)

IT Ashing
Etching
Vapor deposition process
(**plasma**; high-frequency glow-discharge **plasma** treatment **app**. and method by **controlling** pressure of **supplement gas** contg. inert **gas** and reactive gas)

IT 7440-21-3P, Silicon, processes
RL: EPR (Engineering process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PYP (Physical process); PREP (Preparation); PROC (Process)
(deposition; high-frequency glow-discharge **plasma** treatment **app**. and method by **controlling** pressure of **supplement gas** contg. inert **gas** and reactive gas)

IT 2551-62-4, Sulfur hexafluoride
RL: NUU (Other use, unclassified); USES (Uses)
(etchant; high-frequency glow-discharge **plasma** treatment **app**. and method by **controlling** pressure of **supplement gas** contg. inert **gas** and reactive gas)

IT 1333-74-0, Hydrogen, processes 7803-62-5, Silane, processes
RL: CPS (Chemical process); EPR (Engineering process); PEP (Physical, engineering or chemical process); PROC (Process)
(in silicon deposition; high-frequency glow-discharge **plasma** treatment **app**. and method by **controlling** pressure

of **supplement gas** contg. inert **gas** and
reactive gas)
IT 1333-74-0, Hydrogen, processes 7803-62-5, Silane, processes
RL: CPS (Chemical process); EPR (Engineering process); PEP (Physical, engineering or chemical process); PROC (Process)
(in silicon deposition; high-frequency glow-discharge **plasma** treatment **app.** and method by **controlling** pressure of **supplement gas** contg. inert **gas** and reactive gas)

L90 ANSWER 5 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2002:256697 Document No. 136:271818 **Plasma** processing method and **apparatus** for semiconductor device fabrication. Okumura, Tomohiro; Maegawa, Yukihiro; Matsuda, Izuru; Kai, Takayuki (Japan). U.S. Pat. Appl. Publ. US 20020038791 A1 20020404, 36 pp. (English). CODEN: USXXCO. APPLICATION: US 2001-968810 20011003. PRIORITY: JP 2000-303334 20001003; JP 2001-105442 20010404.
AB The **app.** comprises a vacuum chamber maintained at a specified pressure by introducing a specified gas from a gas supply unit and simultaneously performing **exhaustion** by a **pump** as an **exhauster**. A high-frequency power of 100 MHz is supplied by an **antenna** into the vacuum chamber and the **plasma** is generated inside the vacuum chamber. The vacuum chamber is grounded, and sepd. into two areas by a porous metal plate nearly all the peripheral portion of which is grounded, with the substrate placed in one of the areas.
IC ICM C23F001-02
ICS C23C014-00; C23C016-00
NCL 216071000
CC 76-3 (Electric Phenomena)
Section cross-reference(s): 49, 56
ST **plasma** processing **app** semiconductor device fabrication
IT Semiconductor device fabrication
(**plasma** processing method and **app.** for)
IT Sputtering devices
(**plasma** processing method and **app.** for semiconductor device fabrication)
IT Etching
Vapor deposition process
(**plasma**; **plasma** processing method and **app**. for semiconductor device fabrication)

L90 ANSWER 6 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2002:90286 Document No. 136:142955 Spatially programmable microelectronics process **equipment** using segmented **gas injection** showerhead with exhaust **gas** recirculation. Adomaitis, Raymond A.; Kidder, John N., Jr.; Rubloff, Gary W. (The University of Maryland, College Park, USA). PCT Int. Appl. WO 2002008487 A1 20020131, 50 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US23137 20010723. PRIORITY: US 2000-PV220231 20000724.
AB A multizone, segmented showerhead provides a gas impingement flux distribution which is **controllable** in 2 lateral dimensions to

achieve programmable uniformity in CVD, in **plasma** deposition and etching and other processes. Recirculation (**pumping**) of **exhaust** gases back through the showerhead reduces intersegment mixing to achieve a high degree of spatial **control** of the process. This spatial **control** of the impinging gas flux distribution assures that uniformity can be achieved at process design points selected to optimize materials performance. Spatial **control** also permits rapid experimentation by enabling the introduction of intentional nonuniformities so that combinatorial data from across the wafer/substrate provides results of simultaneous expts. at different process design points. This ability is useful for process tuning and optimization in manufg. or for rapid materials and process discovery and optimization in research and development.

IC ICM C23C016-00

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76

ST microelectronic device substrate processing **app** segmented **gas injection** showerhead; CVD **app** segmented **gas injection** showerhead

IT Vapor deposition **apparatus**
(spatially programmable microelectronics process **equipment** using segmented **gas injection** showerhead with exhaust **gas** recirculation)

IT Vapor deposition **apparatus**
(spatially programmable microelectronics process **equipment** using segmented **gas injection** showerhead with exhaust **gas** recirculation)

L90 ANSWER 7 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2001:741413 Inductively coupled **plasma** etching **apparatus**.
Nakajima, Shu (Lam Research Corporation, USA). PCT Int. Appl. WO 2001075931 A2 20011011 DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US10335 20010328. PRIORITY: JP 2000-99728 20000331; US 2000-608883 20000630.

AB An inductively coupled **plasma** etching **apparatus** includes a chamber (100) for generating a **plasma** therein. The chamber (100) is defined by walls of a housing. A coil (313) for receiving high frequency (RF) power is disposed adjacent to and outside of one of the walls (101) of the housing. A metal plate (217) is disposed adjacent to and outside of the wall (101) of the **housing** that the **coil** (313) is disposed adjacent to. The metal plate (217) is positioned in a spaced apart relationship between the coil (313) and the wall (101) of the housing and has radial slits formed therein that extend transversely to the coil (313). A connector (207) electrically connects the metal plate (217) to the coil (313). A method for controlling an inner surface of a wall defining a chamber in which a **plasma** is generated is also described.

IC ICM H01J037-32

L90 ANSWER 8 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2001:710529 **Plasma** central processing unit. [Machine Translation]..
Hiyama, Makoto (Hitachi Kokusai Electric Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2001267097 A2 20010928, 5 pp. (Japanese). CODEN: JKXXAF.

APPLICATION: JP 2000-82652 20000323.

AB [Machine Translation of Descriptors]. Lose the device damage which originates in the gas leakage, and gas leakage to the job territory at the time of microwave introduction window damage, you make that at the same time the device is stopped safely possible. Extra vacuum tank 3 is provided inside microwave transmission line 12 immediately before **plasma** formation tank 2. **Plasma** formation tank 2 vacuum is sealed by microwave introduction window 1, extra vacuum tank 3 vacuum is sealed by microwave introduction window with 1 and extra vacuum window 6. The pressure indicator 8 which inspects the pressure change inside this extra vacuum tank 3 is provided. When inspecting the sudden pressure fluctuation inside extra vacuum tank 3 with pressure indicator 8, judging as the thing which microwave introduction window 1 breaks, **control** system 13 the formation does the danger signal. This danger signal to **gas supply equipment** in **addition** 7 and microwave power source 10, the device is made to stop.

IC ICM H05H001-46
ICS H05H001-46; C23C016-511

L90 ANSWER 9 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2001:554925 Document No. 135:129842 **Plasma** CVD **apparatus**
. Mizoguch, Takahiro; Yokota, Koji; Hayakawa, Yoshito; Maeda, Makoto; Hara, Hiroki; Kubota, Masami (Kubota Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2001207265 A2 20010731, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-18887 20000127.

AB The title **app.** comprises a deposition chamber for contg. a substrate, a means of continuously **introducing** a **gas** into the chamber while switching between deposition and non-deposition gases, a means of generating a **plasma** from the **gas introduced** into the chamber, and a means of **controlling** a gas pressure: the non-deposition **gas** being spike-wise **introduced** at a first pressure for generating a **plasma** and then at a **second pressure lower** than the first to sustaining the **plasma** for **introducing** the deposition **gas**. The efficiency of generating a **plasma** is improved.

IC ICM C23C016-455
ICS C23C016-511; H01L021-205; H05H001-46

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76

ST **plasma** CVD **app**

IT Vapor deposition **apparatus**
(**plasma**; **plasma** CVD **app.** for efficient **plasma** generation)

L90 ANSWER 10 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2000:817188 Document No. 133:354383 Waste gas treatment **apparatus** and substrate treatment **apparatus** equipped with the same. Kosuge, Kazuo (Applied Materials, Inc., USA). Jpn. Kokai Tokkyo Koho JP 2000317265 A2 20001121, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-124315 19990430.

AB This waste gas treatment **app.** is for treating a waste gas discharged by a 1st vacuum pump from a waste gas source and comprises a decompn. chamber made of a dielec. material and connected to the discharge outlet of the 1st vacuum pump, a heat radiating body made of a metal and installed in the decompn. chamber, a **coil antenna** installed in the outer circumference of the decompn. chamber to generate an induced electromagnetic field, a high frequency power source for applying high frequency power to the **coil antenna**, an O supply means for **supplying** an O-contg. **gas** to the

decompn. chamber, and a 2nd pump connected to the outlet part of the decompn. chamber. This substrate treatment **app**. comprises a vacuum treatment chamber, a substrate support installed in the vacuum treatment chamber to support a substrate, a process **gas supply** means for **supplying** process **gases** to the treatment chamber to carry out the prescribed process, a 1st vacuum **pump** for **discharging** a waste gas from the treatment chamber, and the above defined waste gas treatment **app**. Even stable gases, e.g. CH4, C2F6, SiH4, etc., contained in a waste gas and discharged from CVD and etching in semiconductor device fabrication and liq. crystal display **app**. prodn. are efficiently decompd. by **plasma** and heat generated by the heat radiating body.

IC ICM B01D053-70
ICS B01D053-32; B01D053-34; H01L021-205

CC 59-4 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 75, 76

ST waste gas heat **plasma** decompn **app**; semiconductor CVD etching waste gas decompn; liq crystal display CVD etching waste gas

IT Vapor deposition process
(chem., waste gas from; waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

IT Hydrocarbons, processes
RL: PEP (Physical, engineering or chemical process); POL (Pollutant); REM (Removal or disposal); OCCU (Occurrence); PROC (Process)
(fluoro; waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

IT **Plasma**
(high frequency-induced, waste gas decompn. by; waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

IT Waste gases
(waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

IT Thermal decomposition
(waste gas decompn. by; waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

IT Liquid crystal displays
(waste gas from prodn. of; waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

~~IT Etching~~
Semiconductor device fabrication
(waste gas from; waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

IT 75-73-0, Perfluoromethane 76-16-4, Perfluoroethane 7803-62-5, Silane, processes
RL: PEP (Physical, engineering or chemical process); POL (Pollutant); REM (Removal or disposal); OCCU (Occurrence); PROC (Process)
(waste gas decompn. **app**. comprising thermal decompn. and **plasma** decompn. means and substrate treatment **app**. equipped with waste gad decompn. **app**.)

L90 ANSWER 11 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2000:634828 Document No. 133:226348 Method and **apparatus** for heat-melt joining of terminals and electric conductors. Nishiwaki, Toshihiro (Ohara K. K., Japan). Jpn. Kokai Tokkyo Koho JP 2000246434 A2 20000912, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-58577 19990305.

AB The joining process is carried out with **controlling** the atm. of the melt region, from weak oxidizing to reducing atm., depending on the material and the shape of the joined part. The atm. is **controlled** by changing the jetting gas which is used for heating. The heat source may be laser, arc, **plasma**, or light beam. The **app**. is equipped with a heat source, a means for jetting gas, and a gas flow **controller** or a secondary **gas** jetting **nozzle** for **cooling**. The process and the **app**. is suitable for connection of motor **coils** and relay **coils** with terminals.

IC ICM B23K009-00
ICS B23K009-16; B23K026-00; B23K026-12

CC 56-9 (Nonferrous Metals and Alloys)
Section cross-reference(s): 76

ST heat melt joining conductive wire terminal; atm **control** heat melt joining wire

IT **Controlled** atmospheres
Electric **coils**
Electric contacts
Heating
Joining
Metal lines
(heat-melt joining of terminals and elec. conductors with **controlling** heat jetting gas)

IT **Cooling**
Welding of metals
(heat-melt joining of terminals and elec. conductors with **controlling** jetting gas)

L90 ANSWER 12 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2000:624660 Document No. 133:186737 **Apparatus** and method for processing substrates for integrated circuits. Horie, Kuniaki; Fukunaga, Yukio; Ogure, Naoaki; Nakada, Tsutomu; Abe, Masahito; Shibasaki, Mitsunao; Suzuki, Hidenao; Araki, Yuji; Tsukamoto, Kiwamu (Ebara Corp., Japan). Eur. Pat. Appl. EP 1033743 A2 20000906, 23 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2000-104722 20000303. PRIORITY: JP 1999-56154 19990303; JP 1999-141743 19990521; JP 1999-227533 19990811.

AB A substrate processing **app**. forms a thin film of high-dielec. or ferroelec. such as Ba/Sr titanates, or a Cu film for wiring on a substrate, and has a gas ejection head for individually **introducing** at least **two gases** including a material gas and ejecting the gases toward a substrate to be processed. The gas ejection head has at least two gas passageways for individually **introducing** the **two gases**, and at least two temp. **control** devices for individually **controlling** temps. of the gases flowing through the gas passageways.

IC ICM H01L021-00
ICS C23C016-22

CC 76-3 (Electric Phenomena)

ST deposition etching **app** integrated circuit substrate; dielec film deposition; ferroelec film deposition; copper film wiring

IT Vapor deposition **apparatus**
(CVD **app.**; **app.** and method for processing substrates for integrated circuits)
IT Etching **apparatus**
Integrated circuits
Semiconductor device fabrication
Sputtering devices
Thermoregulators
Vapor deposition **apparatus**
(**app.** and method for processing substrates for integrated circuits)
IT Dielectric films
Ferroelectric films
Interconnections (electric)
Metal lines
(**app.** and method for processing substrates for integrated circuits by depositing)
IT Oxidizing agents
Reducing agents
(**app.** and method for processing substrates for integrated circuits using)
IT Noble gases, processes
Organometallic compounds
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(**app.** and method for processing substrates for integrated circuits using)
IT Etching **apparatus**
(**plasma**; **app.** and method for processing substrates for integrated circuits)
IT 7440-50-8, Copper, processes 37303-24-5, Barium strontium titanium oxide (Ba0-1Sr0-1TiO3)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(**app.** and method for processing substrates for integrated circuits by depositing)
IT 7440-32-6D, Titanium, org. compds., processes 7727-37-9, Nitrogen, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(**app.** and method for processing substrates for integrated circuits using)

L90 ANSWER 13 OF 30 HCAPLUS COPYRIGHT 2002 ACS
2000:489065 Document No. 133:113771 **Plasma** processing **apparatus**. Hama, Kiichi (Tokyo Electron Limited, Japan). U.S. US 6089182 A 20000718, 18 pp., Cont.-in-part of U.S. 5,716,451. (English). CODEN: USXXAM. APPLICATION: US 1997-940980 19970930. PRIORITY: JP 1995-233333 19950817; JP 1995-246607 19950831; JP 1996-127941 19960423; US 1996-689780 19960814; JP 1996-281370 19961002.
AB A **plasma** etching **app.** of the induction coupling type for processing an LCD substrate has a process container forming an airtight process room. A work table is arranged in the process room for supporting the LCD substrate. A vacuum **pump** is arranged for **exhausting** and setting the process room into a vacuum state. An **antenna** block having a plurality of dielec. layers is arranged to face the work table. An RF **antenna** is embedded in one of the dielec. layers of the **antenna** block for forming an elec. field. A power supply is connected to the RF **antenna** for applying an RF power. The lowermost layer of the **antenna** block is formed as a

shower head for supplying a process gas into the process room from a position between the RF **antenna** and the work table. At least part of the process gas is turned into **plasma** by the elec. field. In the layer formed as the shower head, the gas passage has such a projected area ratio, on a planar outer-contour of the mount surface of the work table, that is from 15% to 25%.

IC ICM C23C016-00
NCL 118723000I
CC 76-11 (Electric Phenomena)
Section cross-reference(s): 74
ST **plasma** etching **app** radio frequency **antenna**
IT Liquid crystal displays
(**plasma** processing **app**. for processing of LCD substrate)
IT Liquid crystal displays
(**plasma** processing **app**. for processing of LCD substrate)

L90 ANSWER 14 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1999:113857 Document No. 130:160930 Method and **apparatus** for chamber cleaning. Gardner, James T.; Blonigan, Wendell T.; Robertson, Robert M. (Applied Komatsu Technology, Inc., Japan). PCT Int. Appl. WO 9906611 A1 19990211, 17 pp. DESIGNATED STATES: W: JP, KR; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US15706 19980729. PRIORITY: US 1997-904656 19970801.

AB A method and **app**. are given for cleaning a processing chamber. Steps of the method include flowing a cleaning gas into the chamber, and flowing an inert gas into the chamber during at least a portion of the same time as the cleaning gas, such that the ratio of inert gas to cleaning gas is in a range of .apprx.1:1 to .apprx.1:4 by vol. The **app**. includes a sensor for measuring total pressure in the interior of the chamber. **Two** cleaning **gas supplies** may be used: a cleaning gas supply with a 1st valved inlet providing an entrance to the interior of the chamber for passing cleaning gas to the interior of the chamber, and an inert gas supply with a 2nd valved inlet providing an entrance to the interior of the chamber for passing an inert gas to the interior of the chamber. A governor with an input coupled to the sensor maintains the total pressure within the chamber at a prespecified value. First and 2nd mass flow **controllers** are coupled to the 1st and 2nd valved inlets, such that the 1st and 2nd mass flow **controllers** are set to **control** the ratio of the amt. of cleaning gas entering the chamber to the amt. of inert gas entering the chamber so that this ratio is maintained in a range of .apprx.1:1 to .apprx.1:4.

IC ICM C23C016-44
CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76
ST CVD chamber cleaning method **app**; nitrogen fluoride argon CVD chamber cleaning
IT Cleaning
Vapor deposition **apparatus**
(method and **app**. for CVD chamber cleaning)
IT Semiconductor materials
(method and **app**. for cleaning of CVD chamber for processing of)
IT Vapor deposition **apparatus**
(**plasma**; method and **app**. for CVD chamber cleaning)
IT 7783-54-2, Nitrogen trifluoride
RL: NUU (Other use, unclassified); USES (Uses)

(method and **app**. for CVD chamber cleaning using cleaning gas)
IT 7783-54-2, Nitrogen trifluoride
RL: NUU (Other use, unclassified); USES (Uses)
(method and **app**. for CVD chamber cleaning using cleaning gas)

L90 ANSWER 15 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1997:699423 Document No. 127:339614 Manufacture of deposition film by **plasma**-assisted CVD and its **apparatus**. Okabe, Shotaro; Sakai, Akira; Koda, Yuzo; Yoshisato, Sunao; Nishimoto, Tomonori; Yajima, Takahiro (Canon K. K., Japan). Jpn. Kokai Tokkyo Koho JP 09279351 A2 19971028 Heisei, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1996-118508 19960416.
AB The title **app.** has a deposition chamber, an **exhausting pump**, a conductance **control** valve, etc. The **app** . has a dust collector, further. An inert **gas** is **introduced** into an exhausting pipe which links the **exhausting pump** and the deposition chamber after the deposition or while a film is deposited. Amorphous or microcryst. semiconductor of high quality can be manufd. in the **app**. because CVD byproduct deposition on the parts is prevented.
IC ICM C23C016-50
ICS C23C016-44; G03G005-08; H01L021-205; H01L031-04
CC 75-1 (Crystallography and Liquid Crystals)
ST **plasma** assisted CVD **app**; byproduct addn prevention CVD **app**
IT Vapor deposition **apparatus**
(**app**. for **plasma**-assisted CVD having a means of removal of byproduct on parts)
IT Vapor deposition **apparatus**
(**app**. for **plasma**-assisted CVD having a means of removal of byproduct on parts)

L90 ANSWER 16 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1997:617826 Document No. 127:302193 **Plasma** processing in avoiding abnormal discharging and **apparatus** thereof. Okumura, Tomohiro; Nakayama, Ichiro; Haraguchi, Hideo (Matsushita Electric Industrial Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 09246240 A2 19970919 Heisei, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1996-45742 19960304.
AB The title **app**. comprise a vacuum chamber, a support plate laminated by an electrode encased in the chamber, and a top cover whose internal layer is a dielec. plate laminated and laminated by an external insulator plate externally attached over with a spiral discharging coil set in along a **spiral groove**. The depth of the groove is shallower towards the center of the spiral. The arrangement of the spiral coil controls sputtering generation esp. generated around the center of the top cover in prevention of abnormal elec. discharge.
IC ICM H01L021-3065
ICS H01L021-203; H01L021-205; H05H001-46
CC 76-12 (Electric Phenomena)
Section cross-reference(s): 57
ST **plasma** processing spiral coil insulator plate
IT Glass ceramics
(Photoveel, elec. insulator ceramics; **plasma** processing in avoiding abnormal discharging and **app**. thereof)
IT Electric discharge devices
Sputtering
(**plasma** processing in avoiding abnormal discharging and **app**. thereof)
IT Etching
Vapor deposition process

(**plasma**; **plasma** processing in avoiding abnormal
discharging and **app**. thereof)
IT Electric coils
(spiral; **plasma** processing in avoiding abnormal discharging
and **app**. thereof)
IT Electric insulators
(top cover; **plasma** processing in avoiding abnormal
discharging and **app**. thereof)
IT 1314-23-4, Zirconia, properties 1344-28-1, Alumina, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(elec. insulator ceramics; **plasma** processing in avoiding
abnormal discharging and **app**. thereof)

L90 ANSWER 17 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1997:394276 Document No. 127:43617 Inductively coupled **plasma**
treatment **apparatus**. Okumura, Tomohiro; Haraguchi, Hideo;
Nakayama, Ichiro (Matsushita Electric Industrial Co., Ltd., Japan). Jpn.
Kokai Tokkyo Koho JP 09139298 A2 19970527 Heisei, 9 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 1995-297994 19951116.
AB The **app**. has a planar spiral shape discharge coil, which is
installed on a ceramic plate (e.g., .ltoreq.5 mm thick, .ltoreq.350 cm2 in
area, and from an easy-cut material) having **grooves** to fix the
coil, for generation of high frequency magnetic field by
application of a high frequency voltage and acceleration of electrons by
induction elec. field thereby through a dielec. plate in the vacuum
chamber and of a ceramic plate optionally inserted between the ceramic
plate supporting the coil and the dielec. plate. A heater may be placed
between the dielec. plate and the ceramic plate for stabilization of the
temp. of the dielec. plate, and breakage of the ceramic plate with rising
temp. is prevented with no adhesion of the coil to the ceramic plate, and
no abnormal discharge occurs in air.
IC ICM H05H001-46
ICS C23C016-50; C23F004-00; H01L021-203; H01L021-205; H01L021-3065;
H01L021-31
CC 76-11 (Electric Phenomena)
ST inductively coupled **plasma** treatment discharge coil; ceramic
support plate planar discharge coil
IT Sputtering
(etching, inductively coupled **plasma**; etching of silica films
using planar spiral shape discharge coils on ceramic support plates)
IT Electric discharge devices
(inductively coupled **plasma**; planar spiral shape discharge
coils on ceramic support plates)
IT Etching **apparatus**
Etching **apparatus**
(**plasma**, inductively coupled **plasma**; planar spiral
shape discharge coils on ceramic support plates)
IT Etching
(sputter, inductively coupled **plasma**; etching of silica films
using planar spiral shape discharge coils on ceramic support plates)
IT 7631-86-9, Silica, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(film; inductively coupled **plasma** etching with planar spiral
shape discharge coils)
IT 7631-86-9, Silica, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(film; inductively coupled **plasma** etching with planar spiral
shape discharge coils)

L90 ANSWER 18 OF 30 HCAPLUS COPYRIGHT 2002 ACS

1996:102676 Document No. 124:162539 Superconductor coil **apparatus**.
Konno, Masayuki; Tokimitsu, Fujio; Ito, Ikuo; Sakaki, Kyoshi; Sugimoto, Makoto; Nakajima, Hideo; Yoshida, Kyoshi; Tsuji, Hiroshi (Fuji Electric Co Ltd, Japan; Japan Atomic Energy Res Inst). Jpn. Kokai Tokkyo Koho JP 07326510 A2 19951212 Heisei, 7 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1994-120464 19940602.

AB A superconductor coil **app.**, suited for **plasma** confinement in nuclear fusion **app.**, comprises a housing filled with a heat-cured filler material for enhanced stiffness.

IC ICM H01F007-06
ICS H01F006-00; H01F006-06

CC 76-4 (Electric Phenomena)
Section cross-reference(s): 77

ST superconductor **coil housing** stiffness filler resin

L90 ANSWER 19 OF 30 HCAPLUS COPYRIGHT 2002 ACS

1994:523275 Document No. 121:123275 **Apparatus** for generating dielectric-controlled discharges. Neff, Willi; Pochner, Klaus (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung eV, Germany). Ger. DE 4302465 C1 19940310, 7 pp. (German). CODEN: GWXXAW.
APPLICATION: DE 1993-4302465 19930129.

AB The title **app.**, which comprises a gas-filled discharge vol. between two **electrodes**, at least one of which is sepd. from the discharge vol. by a dielec., employ as one **electrode** a **plasma** formed in a gas which is at a lower pressure than the gas in the discharge vol. Use of the **app.** to induce chem reactions, as a means of exciting a dye laser, and in **plasma**-assisted vapor deposition is indicated.

IC ICM H01J065-00
ICS H01J015-02; H01S003-0915; B01D053-00; B01J019-08; C23C016-50

ICA C01B013-11

CC 76-11 (Electric Phenomena)
Section cross-reference(s): 73, 74, 75

ST dielec controlled discharge **app plasma electrode**; laser **pump discharge app**; vapor deposition discharge **app**; photoreaction discharge **app**

IT Electric discharge devices
(dielec.-controlled, with **plasma electrodes**)

IT **Electrodes**
(**plasma**, for dielec.-controlled discharge **app.**)

IT **Electrodes**
(**plasma**, for dielec.-controlled discharge **app.**)

L90 ANSWER 20 OF 30 HCAPLUS COPYRIGHT 2002 ACS

1994:259243 Document No. 120:259243 **Plasma** reactor for processing substrates comprising means for inducing electron cyclotron resonance (ECR) and ion cyclotron resonance (ICR) conditions. Lee, Young H. (International Business Machines Corp., USA). U.S. US 5279669 A 19940118, 14 pp. (English). CODEN: USXXAM. APPLICATION: US 1991-806504 19911213.

AB A **plasma** reactor for forming a dense **plasma** from a gas is described, incorporating a housing, a gas inlet to the housing, a pump for evacuating the **housing**, a magnetic **coil** to generate a magnetic field in the housing, a radio-frequency power supply, an electrode or induction **coil** in the **housing**, and a microwave power supply. The invention overcomes the problem of an upper **plasma** d. limit independent of increases in microwave power by inducing ECR and ICR conditions.

IC ICM C23C016-00

ICS H01L021-00
NCL 118723000MR
CC 76-11 (Electric Phenomena)
Section cross-reference(s): 75
ST **plasma** reactor substrate processing; cyclotron resonance **plasma** processing substrate
IT **Plasma**
(substrate processing by, under ECR and ICR conditions, reactor for)
IT Sputtering
(etching, under ECR and ICR conditions, **app**. for)
IT Vapor deposition processes
(**plasma**, under ECR and ICR conditions, **app**. for)
IT Vapor deposition processes
(**plasma**, under ECR and ICR conditions, **app**. for)

L90 ANSWER 21 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1991:3844 Document No. 114:3844 Overgrowth of iron(III) phosphate on collagen. Dalas, E. (Dep. Chem., Univ. Patras, Patras, GR-26110, Greece). Journal of the Chemical Society, Faraday Transactions, 86(17), 2967-70 (English) 1990. CODEN: JCFTEV. ISSN: 0956-5000.
AB The interaction between polymeric matrixes and inorg. salts is of considerable interest both for the development of novel materials and for understanding fundamental mechanisms underlying biol. mineralization processes. Overgrowth of Fe(III) phosphate dihydrate in aq. supersatd. solns. at 25.degree. seeded by collagen fibrils was examd. Collagen was an effective nucleator of Fe(III) phosphate dihydrate, which was exclusively formed at pH 2.00. Induction times preceding Fe(III) phosphate dihydrate pptn. were inversely proportional to the soln. supersatn., and a surface energy to 89 mJ/m2 was calcd. from this dependence on the basis of the classical nucleation theory. A comparable value was obtained from pptn. kinetics data. The rates of Fe(III) phosphate dihydrate overgrowth were proportional to the soln. supersatn., and an apparent order of 2 was obtained for the pptn. process. This value for the order of pptn. along with the strong indication for the existence of fixed active growth **sites**, may suggest a **surface-controlled**, **spiral** growth mechanism.
CC 13-2 (Mammalian Biochemistry)

L90 ANSWER 22 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1988:584071 Document No. 109:184071 Absence of hypertension despite chronic marked elevations in **plasma** norepinephrine in conscious dogs. King, Bernard D.; Sack, Daniel; Kichuk, Marianne R.; Hintze, Thomas H. (Dep. Physiol., New York Med. Coll., Valhalla, NY, 10595, USA). Hypertension, 9(6), 582-90 (English) 1987. CODEN: HPRTDN. ISSN: 0194-911X.
AB To better define the mechanisms of blood pressure **control** in states ofcatecholamine excess, norepinephrine was infused for 28 days using s.c. implanted osmotic pumps in dogs previously **instrumented** for monitoring left ventricular dynamics and cardiac output. **Plasma** norepinephrine rose from 238 to 4346 pg/mL at 21 days, whereas epinephrine and dopamine levels did not change. Heart rate fell from 85 to 63 beats/min, whereas arterial pressure was unchanged from baseline. Total peripheral resistance rose 0.011 mm Hg/mL/min from a **control** value of 0.029 mm Hg/mL/min, and cardiac output decreased 1093 mL/min from a baseline level of 3575 mL/min. Since stroke vol. did not change, the maintenance of arterial **pressure** is related to **decreases** in cardiac output **secondary** to bradycardia. Buffering mechanisms are responsible for maintenance of systemic arterial pressure because hexamethonium and atropine caused hypertension. Although left ventricular end-diastolic pressure, end-diastolic diam., shortening,

rate of change of pressure, velocity of myocardial shortening, cardiac work, stroke work, and the double product did not change during the study, postmortem examn. demonstrated biventricular hypertrophy. Thus, despite markedly elevated catecholamine levels and no elevation of systemic arterial pressure, myocardial hypertrophy developed. Thus, norepinephrine may be a direct myocardial tropic hormone and intense activation of reflex buffering mechanisms maintains blood pressure in the normal range during chronic catecholamine infusion.

CC 2-8 (Mammalian Hormones)
Section cross-reference(s): 14

IT Blood **plasma**
(norepinephrine of, heart hypertrophy response to, blood pressure in relation to)

L90 ANSWER 23 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1986:489117 Document No. 105:89117 Vapor-phase epitaxy **apparatus**. Nishizawa, Junichi; Suzuki, Sobee (Research Development Corp. of Japan, Japan). Jpn. Kokai Tokkyo Koho JP 61043411 A2 19860303 Showa, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1984-164821 19840808.

AB In a VPE **app**. in which mol. gases contg. each element of a semiconductor to be grown are alternatively introduced onto a substrate with thickness **control**, means are provided to produce an intermediate product from the mol. gas by decompn. or reaction before reaching the substrate. The means may be heating, **plasma**, **plasma** and heating combined, or their combinations with photochem. reactions, which may use .gtoreq.2 light sources of different wavelengths. H2 may be simultaneously supplied to accelerate the reaction, and a **gas nozzle**, a portion of which is transparent to the radiation, may be provided. Thus, SiHCl3 was introduced into the reaction chamber for 0.5-10 s at 10-1-10-7 Pa through a nozzle to which a high-frequency **coil** was attached, the chamber was evacuated, and then H2 was supplied to the chamber for 2-200 s at 10-1-10-7 Pa, and this process was repeated to grow an epitaxial Li layer. The high-frequency supply at 200 W **lowered** the growth **temp**. limit to 690.degree. from 735.degree. without high-frequency supply. The method grows a layer with repetition of monat. layer growth.

IC ICM H01L021-205
ICS H01L021-263

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76

ST VPE **app** alternate **gas supply**; silicon VPE **app**; gallium arsenide VPE **app**

IT Semiconductor materials
(VPE of, with alternate **gas supplies**)

IT Epitaxy
(vapor-phase, of semiconductor films, **app**. for, with alternate **gas supplies**)

IT 1303-00-0P, preparation 7440-21-3P, preparation
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(VPE of, with alternate **gas supplies**)

L90 ANSWER 24 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1983:165171 Document No. 98:165171 Laser working. Minamida, Katsuhiro; Yamaguchi, Shigehiro (Nippon Steel Corp. , Japan). Brit. UK Pat. Appl. GB 2099349 A 19821208, 14 pp. (English). CODEN: BAXXDU. APPLICATION: GB 1981-16338 19810528.

AB Steel is heated locally by a laser beam while a coaxial gas jet is applied to produce a **plasma** at the working point. **Another gas jet** is inclined to direct the **plasma**

against the steel surface. Peripheral shielding gas is applied through multiple orifices in the working **tool**. The **app**. is suitable for welding, cutting, drilling, or hardening of steel, depending on the power d. of laser beam and on gas flow **control**. The gases used are optionally Ar, He, and N. Thus, stainless steel SUS 304 [11109-50-5] strips 3 mm thick were contacted for a butt joint. Laser irradn. was applied through a hole of 3 mm diam., while injecting He coaxially as **plasma**-generating gas. **Plasma-controlling** He was also injected by the inclined jet, esp. to direct the **plasma** along the weld-line zone. Welding speed was 15 mm/s with a focused beam from 2-kW laser. The resulting butt weld was repeatedly bent at a 90.degree. angle for 43 times, compared with 5-25 for conventional arc, flash, or laser welding. The laser-gas **app**. was also applied for local hardening of C steel at 15 mm/s. The resulting quench-hardened zone was .apprx.3 mm deep and .apprx.3 wide.

IC B23K026-14; C21D001-09
CC 55-9 (Ferrous Metals and Alloys)
IT Laser radiation, chemical and physical effects
(cutting and hardening by, gas jets in **app**. for, for steel and stainless steel)
IT Welding
(laser-beam **app**. for, gas jets in, for steel and stainless steel)
IT 12597-68-1, uses and miscellaneous
RL: USES (Uses)
(cutting and joining of, laser-beam **app**. for, gas jets in)
IT 7440-59-7, uses and miscellaneous
RL: USES (Uses)
(jets, in laser-beam welding **app**.)
IT 11121-90-7, uses and miscellaneous
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(surface hardening of, laser-gas jet **app**. for)
IT 11121-90-7, uses and miscellaneous
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(surface hardening of, laser-gas jet **app**. for)

L90 ANSWER 25 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1979:539667 Document No. 91:139667 Boron nutrition problems of cocoa in Nigeria. Omotoso, T. I. (Cocoa Res. Inst. Nigeria, Ibadan, Nigeria). Proc. - Int. Cocoa Res. Conf., 5th, Meeting Date 1975, 312-15, 331. Cocoa Res. Inst. Nigeria: Ibadan, Nigeria. (English) 1977. CODEN: 41JOAC.

AB B deficiency symptoms were obsd. in adult cacao in some parts of Nigeria. Deficient and normal leaves of both amelonado and amazon cacao sampled from 14 different localities covering 62 sites were analyzed for total B contents. From the same **sites, surface coils** (0-6 in) were also sampled and analyzed for hot-water-sol. B. In normal leaves the B contents varied from 3.92 to 25.00 ppm in amazon and 2.0-12.52 ppm in amelonado. Those leaves showing B deficiency symptoms had very low B contents, the values being <2 and <4 ppm, resp., for amelonado and amazon. The hot-water-sol. B in the soils ranged from 0.01 to 0.78 ppm. The appearance of the deficiency symptoms in the leaves seems to have no real relation with the amt. of B in the soil, suggesting that certain factors may **control** the absorption of B by cacao in these soils. In general the values are very low compared with those reported from other parts of the world and point to the need for B fertilizer for cocoa in Nigeria. The low contents of B in deficient leaves and the redn. in pod malformation with the application of solubor supports the earlier finding that the malformation may be due to B deficiency rather than insect damage.

CC 19-4 (Fertilizers, Soils, and Plant Nutrition)

L90 ANSWER 26 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1979:8261 Document No. 90:8261 Study of the chemical mechanisms intervening in the deposition processes under reduced pressure activated by a **plasma**. Granger, P.; Duchemin, J. P. (ETA-Electrotech, Livry-Gargan, Fr.). Vide (Numero Spec., Colloq. Eur. "Surf. - Vide - Metall."), 291-5 (French) 1978. CODEN: VIDEAA. ISSN: 0042-5281.

AB The mass transfer under vacuum is limited mainly by the surface contrary to what takes place at atm. pressure, and takes place by diffusion rather than by convection. The deposit properties are mainly a function of the operating conditions. Exptl., amorphous Si was deposited from a SiH4-Ar mixt. and SiN from a SiH4-N2-NH3 mixt. and Si was reacted with a **plasma** that was generated from CF4. The **app**. had a 120-mm-diam. quartz tube, 2 **electrodes** between which the **discharge** was created, a **pump**, and a 50 Hz generator. The deposition of the Si and SiN and the deposit properties are discussed.

CC 48-6 (Unit Operations and Processes)

ST mass transfer deposition **plasma**; nitride silicon deposition **plasma**

IT **Plasma**
(chem. vapor deposition in)

IT Coating process
(chem. vapor deposition, **plasma**)

IT 7440-21-3, uses and miscellaneous 12033-60-2
RL: USES (Uses)
(coating with, by chem. vapor deposition in **plasma**)

L90 ANSWER 27 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1976:568636 Document No. 85:168636 Apparatus for detection of fission products. Jacobi, Siegfried (Gesellschaft fuer Kernforschung m.b.H., Ger.). Ger. DE 2037053 19760812, 4 pp. (German). CODEN: GWXXAW. APPLICATION: DE 1970-2037053 19700725.

AB An app. is described for detecting fission products by the deposition of solid decay products (e.g. Cs and Rb isotopes) from gaseous fission products (e.g. Xe and Kr) in a pptn. vessel. The fission gas is carried through the vessel with a carrier gas, and at least 1 deposition **electrode** is present, situated near a detector for measuring the radioactivity of the decay product. A magnetic lens (a coil surrounding the pptn. vessel) is provided for depositing the ionized decay product onto the deposition **electrode**. The inner side of the coil lies at the outer side of a wall of the pptn. vessel consisting, at least in this region, of a nonferromagnetic material and the **rest** of the **coil surface** is surrounded by a ferromagnetic material. The deposition **electrode** is formed as part of the wall of the pptn. vessel and lies at ground potential. The constricted part of the flask-like shaped pptn. vessel is closed with a cap which in actuality forms the deposition **electrode**. The detector for measuring the radioactivity of the particles pptd. on the inner side of the cap is located outside the pptn. vessel on the outside of the cap serving as the deposition **electrode**.

IC G21C017-02

CC 71-9 (Nuclear Technology)

IT Fission fragments and products
RL: PROC (Process)
(deposition of solid decay products from gaseous, **electrode** app. for)

IT Fission fragments and products
RL: PROC (Process)
(deposition of solid decay products from gaseous, **electrode** app. for)

L90 ANSWER 28 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1973:529114 Document No. 79:129114 **Apparatus** for fractionation of solutions of proteinaceous materials. Watt, John G. (National Research Corp.). Brit. GB 1323681 19730718, 13 pp. (English). CODEN: BRXXAA. APPLICATION: GB 1969-16536 19690328.

AB An **app**. is described for continuous fractionation of human blood **plasma** proteins with accurate temp. **control**. In a mixing-**cooling** unit the protein soln. and liq. precipitant were **discharged** from **nozzles** so that their streams merged to form a composite stream which impinged on the **cooling** surface of a heat **exchanger**. The protein ppt. formed spilled through the **coiled exchanger** and passed from the bottom of the unit into an aging vessel. The temp. of the emerging fluid was recorded and used to **control** the flow of **coolant** through the heat **exchanger**. Thus, blood **plasma** (pH 7.1 .+-. 0.05) at -1.degree. was fed at 15 l./hr into the mixing/**cooling** unit with 53.3% aq. EtOH as precipitant at a rate of 2.550 l./hr. The mixt. was aged for 2.15 hr and centrifuged.

IC C07G; B01F

CC 63-8 (Pharmaceuticals)

ST **app** fractionation blood protein

IT Proteins
RL: BIOL (Biological study)
(of blood **plasma**, **app**. for fractionation of)

L90 ANSWER 29 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1948:34026 Document No. 42:34026 Original Reference No. 42:7218g-i A progress report on experimental development of **surface** carbon **restoration** in decarburized **coiled** rod and wire material. Kozma, J. L. (Lee Wilson Engineering Co., Inc., Cleveland, O.). Wire and Wire Products, 23, 680-9,719,720 (Unavailable) 1948.

AB Factors most important for successful operation of the process outlined are: (1) the N carrier gas must be uniform and consistent in dew point to establish accurately the vol. of hydrocarbon gas required; (2) there should be uniform and accurate **control** of hydrocarbon flow; (3) the temp. of the steel should be uniform through the load; (4) the temp. of steel should be above the upper crit. or in the austenitic state; and (5) there should be sufficient flow of hydrocarbon-bearing atm. gas with suitable turbulence or agitation throughout the charge being processed. Two sets of carbon potential must be established to obtain perfect ultimate results.

CC 9 (Metallurgy and Metallography)

L90 ANSWER 30 OF 30 HCAPLUS COPYRIGHT 2002 ACS
1940:34891 Document No. 34:34891 Original Reference No. 34:5275e-g Carbureted water-gas set. McIntire, Charles V.; Tiddy, Wm. (Semet-Solvay Engineering Corp.). US 2195465 19400402 (Unavailable). APPLICATION: US .

AB A carbureted water-gas set includes a generator, a carburetor having a substantially unobstructed upper portion and a top outlet, means for introducing oil into the carburetor, which has a restricted upwardly flaring base portion of smaller cross-sectional area than the unobstructed upper portion, the carburetor having an inlet connecting the generator to the base of the carburetor and entering the restricted base portion in downwardly extending substantially tangential relation thereto so that blast **gases introduced** into the carburetor through the inlet immediately impinge against and **swirl** through the **restricted base** portion in contact with the flared walls and exert a lifting action on any C particles which may have been deposited in the base during a previous water-gas carbureting step, and

means for introducing secondary air into the carburetor. Cf. C. A. 33, 3118.7.
CC 21 (Fuels and Carbonization Products)

=> d L85 1-24 cbib abs hitind

L85 ANSWER 1 OF 24 HCAPLUS COPYRIGHT 2002 ACS
2002:539885 Document No. 137:102353 **Apparatus** for exhaust white powder elimination in substrate processing for semiconductor device fabrication. Yadav, Sanjay; Shang, Quanyuan (Applied Materials, Inc., USA). PCT Int. Appl. WO 2002055756 A1 20020718, 37 pp. DESIGNATED STATES: W: CN, JP, KR, SG; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US50617 20011220. PRIORITY: US 2001-756841 20010109.
AB Provided herein is a substrate processing system for semiconductor device manufg. where white contamination powder is easily removed by cleaning the deposition system. Such system comprises a process chamber; and exhaust system; and a means to provide cleaning gas. The exhaust system comprises a vacuum **pump**, a vacuum **exhaust** line, and a filtering **app.** installed downstream for the vacuum **pump**, a vacuum **exhaust** line, and a filtering **app.** installed downstream from the vacuum pump and within the vacuum exhaust line. Also provided is a method for eliminating or reducing solid residue accumulation in an exhaust line by **introducing** cleaning **gas** to the process chamber and further to the exhaust line; trapping solid residue by a filtering **app.** downstream for vacuum **pump** and within the **exhaust** line; trapping solid residue by a filtering **app.** downstream from vacuum **pump** and within the **exhaust** line; heating the filtering **app.** to re-activate the cleaning gas, which reacts with trapped solid residue and convert it to gaseous residue; and releasing the gaseous residue through the exhaust line. In-situ or remote **plasma** resource cleaning may be employed in conjunction with the above method.
IC ICM C23C016-44
ICS C23F004-00
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 75
ST cleaning deposition **app** semiconductor device fabrication
IT Cleaning
Etching **apparatus**
Filters
Heat treatment
Semiconductor device fabrication
Vacuum **pumps**
Vapor deposition **apparatus**
(**app.** for **exhaust** white powder elimination in substrate processing for semiconductor device fabrication)
IT Chlorides, uses
Fluorides, uses
Halides
RL: NUU (Other use, unclassified); USES (Uses)
(cleaning gases; **app.** for exhaust white powder elimination in substrate processing for semiconductor device fabrication)
IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoro, cleaning gases; **app.** for exhaust white powder elimination in substrate processing for semiconductor device fabrication)
IT Cleaning

(**plasma**; **app**. for exhaust white powder elimination
in substrate processing for semiconductor device fabrication)
IT Ventilation, mechanical
(systems; **app**. for exhaust white powder elimination in
substrate processing for semiconductor device fabrication)
IT 75-73-0, Tetrafluoromethane 76-16-4, Perfluoroethane 2551-62-4, Sulfur
fluoride (SF6) 7664-39-3, Hydrogen fluoride, uses 7782-41-4, Fluorine,
uses 7783-54-2, Nitrogen fluoride (NF3)
RL: NUU (Other use, unclassified); USES (Uses)
(**app**. for exhaust white powder elimination in substrate
processing for semiconductor device fabrication)

L85 ANSWER 2 OF 24 HCAPLUS COPYRIGHT 2002 ACS
2002:388695 Document No. 136:394313 Exhaust gas recycling **apparatus**
in semiconductor device manufacture. Shitara, Chiharu (NEC Corp., Japan).
Jpn. Kokai Tokkyo Koho JP 2002151467 A2 20020524, 12 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 2000-348860 20001115.
AB The **app**. contain vacuum **pumping** compartments to
exhaust the gases produced in **plasma** reaction chambers,
compartments to dil. the **exhaust** gases from the **pumping**
compartments, compartments to refine the exhaust gases, and compartments
to distribute the refined gases to the reaction chambers as well as diln.
gas prodn. compartments. Etching gases necessary for **plasma**
reaction are **supplied** from both etching **gas**
supply compartments as well as the refined gas distribution
compartments. The **app**. can recycle exhaust gases with high
efficiency.
IC ICM H01L021-3065
CC 76-3 (Electric Phenomena)
ST recycling exhaust gas **app plasma** etching;
semiconductor device recycling exhaust gas
IT Etching **apparatus**
Semiconductor device fabrication
(exhaust gas recycling **app**. in semiconductor device manuf.)
IT Hydrocarbons, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(fluoro; exhaust gas recycling **app**. in semiconductor device
manuf.)
IT Hydrocarbons, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(fluoro; exhaust gas recycling **app**. in semiconductor device
manuf.)

L85 ANSWER 3 OF 24 HCAPLUS COPYRIGHT 2002 ACS
2001:745784 Document No. 135:296479 **Plasma** CVD **apparatus**
eliminating drift of reactive gases. Urano, Hiroshi; Hara, Masayuki
(Hitachi Kokusai Electric Inc., Japan). Jpn. Kokai Tokkyo Koho JP
2001284256 A2 20011012, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION:
JP 2000-91304 20000329.
AB The **plasma** CVD **app**. has a pair of electrodes, the
upper one having inlet holes for reactive **gases**, wherein an
addnl. **gas supply** hole is formed at the center
of the upper electrode. Drift of the gases and hence deposition of
foreign matters on a substrate are eliminated, thereby increasing the
yield.
IC ICM H01L021-205
ICS C23C016-455; C23F004-00; H01L021-3065; H05H001-46
CC 75-1 (Crystallography and Liquid Crystals)
ST **plasma** CVD **app** reactive gas drift elimination;
semiconductor device manuf **plasma** CVD

IT Semiconductor device fabrication
(**plasma** CVD **app**. eliminating drift of reactive
gases)
IT Semiconductor device fabrication
(**plasma** CVD **app**. eliminating drift of reactive
gases)

L85 ANSWER 4 OF 24 HCAPLUS COPYRIGHT 2002 ACS
2001:617388 Document No. 135:188911 **Plasma** CVD **apparatus**
and gas feeding nozzles thereof. Hoshino, Masakazu; Miya, Takeshi;
Hachitani, Masayuki; Oyama, Katsumi (Hitachi Ltd., Japan). Jpn. Kokai
Tokkyo Koho JP 2001230242 A2 20010824, 8 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2000-40689 20000218.
AB The title **app**. comprises (1) a CVD chamber, (2) a **double**
-tube feed gas **nozzles** each having a flange on its end and
attached to the chamber wall, and (3) a low-thermal cond. plate bound
between the flanges for the inner and outer tubes so that the feed gas
SiH4 flowing in the inner tube is kept **cooled** from the
ion-impact heated **coolant** Ar gas flowing in the outer tube. The
double-tube feed gas tubes prevent thermal decompn. of the feed SiH4 and
consequently eliminate thermal decompn.-caused residues deposited on the
tube walls.
IC ICM H01L021-31
ICS C23C016-44
CC 76-11 (Electric Phenomena)
ST silicon hydride feed double tube argon **cooling** decompn residue
IT **Nozzles**
(feed **gas**, **double**-tube; **plasma** CVD
app. and gas feeding nozzles thereof)
IT Thermal conductivity
(of feed gas, prevention of; **plasma** CVD **app**. and
gas feeding nozzles thereof)
IT Thermal insulators
(**plasma** CVD **app**. and gas feeding nozzles thereof)
IT Vapor deposition **apparatus**
(**plasma**; **plasma** CVD **app**. and gas feeding
nozzles thereof)
IT 7429-90-5, Aluminum, properties 24304-00-5, Aluminum nitride (AlN)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(feed gas double tube; **plasma** CVD **app**. and gas
feeding nozzles thereof)
IT 1344-28-1, Alumina, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(nozzle; **plasma** CVD **app**. and gas feeding nozzles
thereof)
IT 1344-28-1, Alumina, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(nozzle; **plasma** CVD **app**. and gas feeding nozzles
thereof)

L85 ANSWER 5 OF 24 HCAPLUS COPYRIGHT 2002 ACS
2001:531357 Flame spraying method and thermal spraying **equipment**.
[Machine Translation].. Kobayashi, Yasuyuki; Hiromoto, Etsumi;
Manabe, Yukio; Norimatsu, Yasufumi; Sakakibara, Noriyuki (Mitsubishi
Heavy Industries, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2001200354 A2
20010724, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-9494
20000118.
AB [Machine Translation of Descriptors]. This invention, as the oxidation of
the spray particle is prevented in regard to the thermal spraying
equipment and flame spraying method, retarding the occurrence of

the fume to the utmost, the formation try that it is possible the fine membrane. In flame spraying torch 9, installing the chamber 5 for the air shutoff which possesses **cooling** mechanism 12, as from the flame spraying torch 9 point covers to the base material 1 vicinity with chamber, 5 1: 3 or more 1: sets the diameter of chamber 5 10 or less vis-a-vis the diameter of **plasma** arc, 3 **supplies** **auxiliary gas** 6 inside chamber 5, protects **plasma** arc 3 with auxiliary gas 6, to set exhaust **nozzle** 7 of **auxiliary gas** 6 to the difference of 50 mm or less of 10 mm than the point of flame spraying torch 9 or more, auxiliary gas 6 vis-a-vis the central axis of **plasma** arc 3 5 - With angle of 30 deg making gush with the flow rate of 1 - 3 times vis-a-vis **plasma** air current, sprays.

IC ICM C23C004-12

L85 ANSWER 6 OF 24 HCAPLUS COPYRIGHT 2002 ACS

2001:111382 Document No. 134:139625 Exhaust pipe system and evacuation method for particle-precipitating exhaust gas. Okamoto, Keiji; Fukuda, Akira (Kanegafuchi Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2001040479 A2 20010213, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-210800 19990726.

AB The title system comprises an exhaust pipe for guiding the particle-pptg. **exhaust** gas form a **pump** to a removal device, a pipe having a nozzle for high-speed **injection** of an inert **gas** such as N2 into the exhaust pipe. A method for evacuating the particle-pptg. exhaust gas using the above system is also described. The system and method are useful in **plasma** CVD.

IC ICM C23C016-44
ICS H01L021-205

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 47

ST exhaust gas pipe **plasma** CVD

IT Vapor deposition **apparatus**
Vapor deposition process
(**plasma**; exhaust pipe system and evacuation method for particle-pptg. exhaust gas)

IT Vapor deposition **apparatus**
Vapor deposition process
(**plasma**; exhaust pipe system and evacuation method for particle-pptg. exhaust gas)

L85 ANSWER 7 OF 24 HCAPLUS COPYRIGHT 2002 ACS

2000:658360 Document No. 133:231459 Design of a semiconductor single wafer processing reactor with adjustable gas flow. Sato, Kiyoshi (ASM Japan K.K., Japan). U.S. US 6120605 A 20000919, 14 pp. (English). CODEN: USXXAM. APPLICATION: US 1998-19394 19980205.

AB A single wafer processing type of a semiconductor processing system is provided so as to achieve that residual particles inside a reactor thereof are efficiently removed and a **gas injected** into the reactor is uniformly flowed over a wafer in a wide range of the gas flow rate. The semiconductor processing system includes gas flow adjusting means having a slit communicated with an **exhaust** port for **pumping** out a **gas injected** into a reactor from the reactor. The slit is provided annularly around a circumference of a wafer and positioned below a position of the wafer, and a width of the slit is narrowed about the exhaust port.

IC ICM C23C016-00

NCL 118715000

CC 76-3 (Electric Phenomena)

ST semiconductor device fabrication vapor deposition **app** adjustable

gas flow
IT Semiconductor device fabrication
Vapor deposition **apparatus**
(design of a semiconductor single wafer processing reactor with adjustable gas flow)
IT Vapor deposition process
(**plasma**; design of a semiconductor single wafer processing reactor with adjustable gas flow)

L85 ANSWER 8 OF 24 HCAPLUS COPYRIGHT 2002 ACS
2000:623641 Document No. 133:186712 Downstream **plasma** etching **apparatus** using oxygen gas mixture for semiconductor device fabrication. Gorin, Georges J. (Dry Plasma Systems, Inc., USA). U.S. US 6112696 A 20000905, 4 pp. (English). CODEN: USXXAM. APPLICATION: US 1998-24286 19980217.
AB A constriction in the exhaust side of a discharge chamber contg. O isolates the O supply from the rest of the system. A constriction of equal size or larger was used in the **supply** of **another gas,** thereby enabling mixts. of O and other gases to be used in a downstream **plasma** system. In one embodiment of the invention, the gases are dissocd. sep. and then combined in a mixing chamber. In another embodiment, O is dissocd. and then a lighter gas is added and the mixt. is dissocd. In a preferred embodiment of the invention, the lighter gas is selected from the group consisting of H2O vapor and N.
IC ICM C23C016-00
ICS B44C001-22; B05D003-14
NCL 118723000IR
CC 76-3 (Electric Phenomena)
ST **plasma** etching oxygen mixt
IT Etching **apparatus**
Mixing
Semiconductor device fabrication
Water vapor
(downstream **plasma** etching **app**. using oxygen gas mixt. for semiconductor device fabrication)
IT Etching **apparatus**
(**plasma**; downstream **plasma** etching **app**. using oxygen gas mixt. for semiconductor device fabrication)
IT 7727-37-9, Nitrogen, uses 7732-18-5, Water, uses 7782-44-7, Oxygen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(downstream **plasma** etching **app**. using oxygen gas mixt. for semiconductor device fabrication)

L85 ANSWER 9 OF 24 HCAPLUS COPYRIGHT 2002 ACS
2000:551419 Document No. 133:157929 **Apparatus** and method for film deposition, and cleaning method. Onoe, Seiji; Tohnono, Ichiro; Takagi, Shigeyuki; Nishimura, Hiroshi (Toshiba Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2000223429 A2 20000811, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-172692 19990618. PRIORITY: JP 1998-336986 19981127.
AB A film deposition **app**. is described, which comprises a support for a substrate in a deposition chamber, a means of **supplying** a processing **gas** to the substrate, and a pumping path surrounding the support. The pumping gap for connecting the processing space between the support and supplying means to the pumping path has different gap lengths between its exhaust side and the side opposite to the exhaust side to obtain a stable gas flow and to carry out **plasma** cleaning in a short period of time. An **app**. for carrying out the above method is also described.
IC ICM H01L021-205

ICS C23C016-44; H01L021-3065
CC 75-1 (Crystallography and Liquid Crystals)
ST film deposition **app plasma** cleaning
IT **Pumping**
Vapor deposition **apparatus**
Vapor deposition process
(**exhaust pumping** gap in **app**. and method for film deposition, and cleaning method)
IT **Pumping**
Vapor deposition **apparatus**
Vapor deposition process
(**exhaust pumping** gap in **app**. and method for film deposition, and cleaning method)

L85 ANSWER 10 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1999:707259 Document No. 132:30541 Increased bradykinin levels accompany the hemodynamic response to acute inhibition of angiotensin-converting enzyme in dogs with heart failure. Su, Jin Bo; Barbe, Fabrice; Crozatier, Bertrand; Campbell, Duncan J.; Hittinger, Luc (Institut National de la Sante et de la Recherche Medicale (INSERM), Unite 400, Faculte de Medecine, Creteil, Fr.). Journal of Cardiovascular Pharmacology, 34(5), 700-710 (English) 1999. CODEN: JCPCDT. ISSN: 0160-2446. Publisher: Lippincott Williams & Wilkins.
AB To det. the short-term effects of angiotensin-converting enzyme (ACE) inhibition on hemodynamics and circulating levels of norepinephrine, angiotensin, and bradykinin, responses to enalaprilat and perindoprilat were examd. at doses of 0.03, 0.3, and 1 mg/kg in permanently **instrumented** conscious dogs with pacing-induced heart failure (right ventricular pacing, 240-250 beats/min, 3 wk). All doses of the **two** inhibitors produced similar **decrease** in mean aortic **pressure** and increase in cardiac output. Neither inhibitor affected **plasma** norepinephrine level. Both compds. induced a similar 60-80% decrease in blood angiotensin II level, a similar two- to eightfold increase in blood angiotensin I level, and a 80-95% decrease in the angiotensin II/angiotensin I ratio. There were also a fourfold to 10-fold increase in blood bradykinin-(1-9) level, a twofold increase in blood bradykinin-(1-7) level, and a 70-85% decrease in bradykinin-(1-7)/bradykinin-(1-9) ratio. In addn., the changes in total peripheral resistance induced by the two ACE inhibitors were weakly but significantly correlated with the changes in blood angiotensin II or blood bradykinin-(1-9). Thus whatever the specificity of enalaprilat and perindoprilat, both inhibitors produced similar acute hemodynamic effects in dogs with heart failure, which was assocd. with marked decrease in circulating angiotensin II level and increase in bradykinin-(1-9) level. This study, which measures for the first time in heart failure the blood bradykinin level after ACE inhibitors, indicates, in concert with angiotensin II redn., a role for increased bradykinin-(1-9) level in mediating short-term hemodynamic effects of ACE inhibition in this model of heart failure.
CC 1-8 (Pharmacology)

L85 ANSWER 11 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1999:243621 Document No. 130:298800 Experiment on removing hydrocarbon by using RF oxygen or hydrogen **plasma**. Tada, S.; Sakamoto, Y.; Suzuki, T.; Saito, H.; Oikawa, M.; Kidokoro, A.; Enoki, H. (Nichimen Electronic Technology Corporation, Saitama, 350-1155, Japan). Vacuum, 53(1-2), 321-324 (English) 1999. CODEN: VACUAV. ISSN: 0042-207X. Publisher: Elsevier Science Ltd..
AB Aiming to develop a compact and inexpensive in situ cleaning device, an expt. on the removal of hydrocarbon by oxygen and hydrogen **plasmas**

was carried out. The **plasmas** were produced using a 60 MHz RF-discharge. The oxygen **plasma** had an electron temp. Te = 5 eV and an ion d. was 2 .times. 1010 cm-3 with a pressure of 2.3 m Torr and an RF power of 130 W. Observations showed a **decrease** in the hydrocarbon **pressure** by about **two** orders of magnitude after irradn. by the oxygen **plasma** for about 1 h, though much of the decrease occurred in the first few minutes.
CC 48-11 (Unit Operations and Processes)
ST cleaning **app** hydrocarbon removal oxygen hydrogen **plasma**
IT Cleaning
Cleaning
(**app**.; hydrocarbon removal by using RF oxygen or hydrogen **plasma** in relation to development of in situ)
IT **Plasma**
(hydrocarbon removal by using RF oxygen or hydrogen **plasma**)
IT Hydrocarbons, processes
RL: REM (Removal or disposal); PROC (Process)
(hydrocarbon removal by using RF oxygen or hydrogen **plasma**)
IT 1333-74-0, Hydrogen, reactions 7782-44-7, Oxygen, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(hydrocarbon removal by using RF oxygen or hydrogen **plasma**)

L85 ANSWER 12 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1999:57130 Document No. 130:201902 Development of vacuum seals for diagnostic windows of the International Thermonuclear Experimental Reactor. Nagashima, A.; Nishitani, T.; Fujisawa, T.; Sugie, T.; Kasai, S. (Kansai Research Establishment, Japan Atomic Energy Research Institute (JAERI), Tokai-mura, Naka-gun, Ibaraki, 319-1195, Japan). Review of Scientific Instruments, 70(1, Pt. 2), 460-463 (English) 1999. CODEN: RSINAK. ISSN: 0034-6748. Publisher: American Institute of Physics.
AB For International Thermonuclear Expt. Reactor (ITER) diagnostic windows a new sealing method based on a V-shaped elastic ring has been developed. The ring, compressed by **two** valves, **makes vacuum** tight contact on the polished edge of the window material. Two types of V-shaped rings have been tested (one of silver coated copper and one in polyimide Vespel SP-1) with three different window materials (fused quartz, sapphire, and ZnSe). The wavelength range of interest is from .apprx.0.4 to .apprx.10 .mu.m. The performance of the seals to inner pressure rise resistance, the heat cycle, and acceleration at the level expected in the ITER environment has been examd. The tests have been carried out successfully for 120 mm diam. windows.
CC 71-2 (Nuclear Technology)
Section cross-reference(s): 73
ST tokamak diagnostic window vacuum seal ITER; fusion **plasma** diagnostic window vacuum seal ITER
IT Leak
Tokamak **plasmas**
(development of vacuum seals for diagnostic windows of the ITER tokamak)
IT Vacuum **apparatus**
Vacuum **apparatus**
(seals; development of vacuum seals for diagnostic windows of the ITER tokamak)

L85 ANSWER 13 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1998:800442 Document No. 130:59392 **Apparatus** for **plasma** chemical vapor deposition in vacuum. Matsumura, Fumio; Fujii, Yoichi (Toyo Communication Equipment Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 10330947 A2 19981215 Heisei, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-157629 19970530.

AB In the **app.**, a reduced-pressure room for film formation is connected to a **2nd reduced-pressure** room for supply and recovery of substrates and both rooms are sepd. by a openable vacuum valve. Continuous film formation was obtained without deposition of particles by using the **app.**
IC ICM C23C016-50
ICS C23C016-54; H01L021-205; H01L021-31
CC 75-1 (Crystallography and Liquid Crystals)
ST **plasma** CVD **app** continuous film formation
IT Vapor deposition **apparatus**
(**plasma**; **app.** for continuous **plasma** chem. vapor deposition in vacuum)
IT Vapor deposition **apparatus**
Vapor deposition **apparatus**
(vacuum; **app.** for continuous **plasma** chem. vapor deposition in vacuum)

L85 ANSWER 14 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1997:249571 Document No. 127:12589 Ion deposition experiments as a **tool** for the study of the spatial distribution of analyte ions in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer. Chen, Yibai; Farnsworth, Paul B. (Dep. Chemistry Biochemistry, Brigham Young Univ., Provo, UT, 84602, USA). Spectrochimica Acta, Part B: Atomic Spectroscopy, 52B(2), 231-239 (English) 1997. CODEN: SAASBH. ISSN: 0584-8547. Publisher: Elsevier.
AB A nickel mesh was placed in the ion beam in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer. Deposits on the mesh from the beam were analyzed by SEM combined with energy dispersive x-ray fluorescence spectroscopy in an effort to measure element-specific ion distributions in the beam. The expts. suggest that the distribution of material in the deposit depends on factor other than the spatial distributions of at. ions in the ion beam. Neutral atoms can affect the formation of the deposit, as can either charged or neutral microparticulates. Caution is urged in the use of deposition expts. of this type to study ion beam behavior.
CC 79-2 (Inorganic Analytical Chemistry)
Section cross-reference(s): 73
ST inductively coupled **plasma** mass spectrometer; ion deposition spatial distribution analyte
IT X-ray spectroscopy
X-ray spectroscopy
(fluorescence, energy-dispersive; ion deposition expts. as a **tool** for the study of the spatial distribution of analyte ions in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer)
IT Mass spectrometers
Mass spectrometry
(inductively coupled **plasma**; ion deposition expts. as a **tool** for the study of the spatial distribution of analyte ions in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer)
IT Ion beams
Scanning electron microscopy
(ion deposition expts. as a **tool** for the study of the spatial distribution of analyte ions in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer)
IT Fluorometry
Fluorometry
(x-ray, energy-dispersive; ion deposition expts. as a **tool**

for the study of the spatial distribution of analyte ions in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer)

IT 7429-90-5, Aluminum, analysis 7440-29-1, Thorium, analysis
RL: ANT (Analyte); ANST (Analytical study)
(ion deposition expts. as a **tool** for the study of the spatial distribution of analyte ions in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer)

IT 7429-90-5, Aluminum, analysis 7440-29-1, Thorium, analysis
RL: ANT (Analyte); ANST (Analytical study)
(ion deposition expts. as a **tool** for the study of the spatial distribution of analyte ions in the **second vacuum** stage of an **inductively** coupled **plasma** mass spectrometer)

L85 ANSWER 15 OF 24 HCAPLUS COPYRIGHT 2002 ACS

1996:570138 Document No. 125:284740 Gas transfer and blood compatibility of fluorinated polyimide membranes. Kawakami, Hiroyoshi; Mikawa, Masato; Takagi, Jun; Nagaoka, Shoji (Dep. of Industrial Chem., Tokyo Metropolitan Univ., Tokyo, 192-03, Japan). Journal of Biomaterials Science, Polymer Edition, 7(12), 1029-1038 (English) 1996. CODEN: JBSEEA. ISSN: 0920-5063. Publisher: VSP.

AB Fluorinated polyimide derived from 2,2'-bis(3,4-dicarboxylphenyl) hexafluoropropane dianhydride (6FDA) and bis[4-(4-aminophenoxy) phenyl]sulfone (**APPS**) was synthesized to develop a novel membrane oxygenator combining excellent gas transfer and blood compatibility. The asym. gas **exchange** membranes of 6FDA-**APPS** made by a dry/wet process consisted on an ultrathin and defect-free skin layer supported by a porous substructure. The O transfer through the 6FDA-**APPS** membrane was extremely augmented as compared with that of the presently available membrane, poly(dimethylsiloxane), and the previously reported 6FDA-DDS membrane. Since CO2 transfer through the 6FDA-**APPS** membrane increased with a **decrease** in CO2 **pressure** according to **dual** -mode transport theory, CO2 from the membrane was selectively removed at low CO2 pressure. For the evaluation of in vitro blood compatibility, the platelet adhesion and the **plasma** protein absorption on the surface of the 6FDA-**APPS** membrane were obsd. by using SEM and the amts. of platelet and **plasma** protein were detd. by an amino acid analyzer. The results indicated that the fluorinated polyimide membranes showed excellent blood compatibility.

CC 63-7 (Pharmaceuticals)

L85 ANSWER 16 OF 24 HCAPLUS COPYRIGHT 2002 ACS

1996:284581 Document No. 124:304960 Deposition of optical thin-films by arc-discharging ion plating and **apparatus** thereof. Ooyamaguchi, Makiko; Sasagawa, Koichi; Onizuka, Kanemi (Nippon Kogaku Kk, Japan). Jpn. Kokai Tokkyo Koho JP 08060360 A2 19960305 Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-190623 19940812.

AB The process involves generating arc-discharge **plasma** in a 1st vacuum chamber and irradiating the **plasma** on an ion-plating material provided in a **2nd** vacuum chamber whose **pressure** is **lower** than that in the 1st chamber. The depositing films may be optical films such as reflection-preventing and reflection-enhancing films made of titania, silica, or their laminates. The process employs impression of a bias voltage across a substrate to be coated and its support table for increasing the d. of the films deposited.

IC ICM C23C014-54
ICS C23C014-32

CC 76-14 (Electric Phenomena)
Section cross-reference(s): 57, 73, 75
IT **Plasma**
(arc discharge; deposition of optical thin-films by arc-discharging ion plating and **app**. thereof)
IT Optical absorption
(deposition of optical thin-films by arc-discharging ion plating and **app**. thereof)
IT Optical materials
(films, deposition of optical thin-films by arc-discharging ion plating and **app**. thereof)
IT Vapor deposition processes
(ion plating, deposition of optical thin-films by arc-discharging ion plating and **app**. thereof)
IT 7631-86-9P, Silica, properties 13463-67-7P, Titania, properties
RL: PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation)
(optical films; deposition of optical thin-films by arc-discharging ion plating and **app**. thereof)

L85 ANSWER 17 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1995:867693 Document No. 123:259351 Gas **plasma apparatus** with movable film liners for prevention of formation of **plasma** polymerizate deposits on reactor walls. Nomura, Hiroshi (Neomecs Incorp., USA). PCT Int. Appl. WO 9515576 A1 19950608, 22 pp. DESIGNATED STATES: W: JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1994-US13555 19941122. PRIORITY: US 1993-158870 19931130.
AB The **app**. is provided with a reaction tunnel having two ends connected with **two vacuum** chambers, an electrode **means** for producing a gas **plasma** within the reaction tunnel, moving film liners (e.g. PET, polycarbonate, polypropylene, polyethylene, aliph. polyamide, arom. polyamide, or PTFE films) following a path in close proximity with all inner surfaces of the reaction tunnel wherein the gas **plasma** is produced, and a means for moving through the reaction tunnel an article to be treated by the gas **plasma**.
IC ICM H01J037-32
CC 38-3 (Plastics Fabrication and Uses)
ST plastic film liner gas **plasma app**; polyester film liner gas **plasma app**; polycarbonate film liner gas **plasma app**; polyethylene film liner gas **plasma app**; polyamide film liner gas **plasma app**; PTFE film liner gas **plasma app**
IT **Plasma**
(**app**.; with movable film liners for prevention of formation of **plasma** polymerizate deposits on reactor walls)
IT Polyamides, uses
Polycarbonates, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(liner films; for gas **plasma app**. for prevention of formation of **plasma** polymerizate deposits on reactor walls)
IT 9002-84-0, PTFE 9002-88-4, Polyethylene 9003-07-0, Polypropylene 25038-59-9, Poly(ethylene terephthalate), uses
RL: TEM (Technical or engineered material use); USES (Uses)
(liner films; for gas **plasma app**. for prevention of formation of **plasma** polymerizate deposits on reactor walls)

L85 ANSWER 18 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1994:524320 Document No. 121:124320 **Instrument**-induced effects in the analysis of polycyclic aromatic compounds by capillary gas

chromatography with atomic emission detection (GC-AED). Janak, Karel; Oestman, Conny; Carlsson, Haakan; Bemgaard, Agneta; Colmsjoe, Anders (Dep. Anal. Chem., Natl. Inst. Occup. Health, Solna, S-171 84, Swed.). Journal of High Resolution Chromatography, 17(3), 135-40 (English) 1994. CODEN: JHRCE7. ISSN: 0935-6304.

AB Peak splitting of high mol. wt. polycyclic arom. compds. originating from the microwave **plasma** of an at. emission detector (AED) coupled to a GC was described and evaluated. The influence of the solute structure, solute concn., and phys. conditions in the AED (such as detector temp., make-up gas flow, concn. of reagent gases and distance of column end from the **plasma**) were studied. An explanation is presented for peak splitting, which is based on an insufficient solute decompn. and solute mass flow in the discharge tube. Modification of the **instrument** by **introduction** of **addnl**. make-up **gas** applied through the transfer line was shown to improve peak shape and solute response.

CC 80-1 (Organic Analytical Chemistry)
Section cross-reference(s): 22, 66, 73

ST **instrument** induced effect GC AED; polycyclic arom compd analysis GC AED; peak splitting arom compd GC AED; capillary gas chromatog polycyclic arom compd; atomic emission detection capillary gas chromatog

IT Spectrochemical analysis
(at. emission, anal. of polycyclic arom. compds. by capillary gas chromatog. and, **instrument**-induced effects in)

IT Chromatography, gas
(capillary, anal. of polycyclic arom. compds. by, with at. emission detection, **instrument**-induced effects in)

IT Aromatic compounds
Aromatic hydrocarbons, analysis
RL: ANT (Analyte); ANST (Analytical study)
(polycyclic, anal. of, by capillary gas chromatog. with at. emission detection, **instrument**-induced effects in)

IT 50-32-8, Benzo[a]pyrene, analysis 53-70-3, Dibenz[a,h]anthracene 56-55-3, Benz[a]anthracene 85-01-8, Phenanthrene, analysis 86-73-7, Fluorene 86-74-8, Carbazole 120-12-7, Anthracene, analysis 129-00-0, Pyrene, analysis 189-92-4, 10-Azabenzo[a]pyrene 191-24-2, Benzo[ghi]perylene 192-97-2, Benzo[e]pyrene 193-39-5, Indeno[1,2,3-cd]pyrene 194-59-2, Dibenzo[c,g]carbazole 198-55-0, Perylene 205-82-3, Benzo[j]fluoranthene 218-01-9, Chrysene 224-42-0, Dibenz[a,j]acridine 224-53-3, Dibenz[c,h]acridine 225-11-6, Benz[a]acridine 225-51-4, Benz[c]acridine 226-36-8, Dibenz[a,h]acridine 226-92-6, Dibenz[a,i]acridine 229-87-8, Phenanthridine 230-27-3, Benzo[h]quinoline 238-84-6, Benzo[a]fluorene 239-01-0, Benzo[a]carbazole 239-64-5, Dibenzo[a,i]carbazole 243-28-7, Benzo[b]carbazole 244-99-5, 4-Azafluorene 260-94-6, Acridine 34777-33-8, Benzo[c]carbazole
RL: ANT (Analyte); ANST (Analytical study)
(anal. of, by capillary gas chromatog. with at. emission detection, **instrument**-induced effects in)

L85 ANSWER 19 OF 24 HCAPLUS COPYRIGHT 2002 ACS

1994:416180 Document No. 121:16180 **Apparatus** for manufacture of deposited oxide ceramic film. Harada, Takahiro; Gamo, Mika (Toppan Printing Co Ltd, Japan). Jpn. Kokai Tokkyo Koho JP 06093447 A2 19940405 Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1992-244612 19920914.

AB The **app**. consists of a long transparent plastic film moving in a vacuum chamber, a coating drum for continuously vacuum depositing an oxide ceramic, means for transporting the deposited film into **another** **vacuum** chamber, and **means** for **plasma** treating

the film with high-frequency O. The deposited film has good
gas-impermeability.
IC ICM C23C014-58
ICS C23C014-56
CC 57-2 (Ceramics)
Section cross-reference(s): 38
ST **app** deposited oxide ceramic film; plastic film deposited oxide ceramic; gas impermeability oxide ceramic film
IT Ceramic materials and wares
(film, depositing of, on transparent plastic film, **app**. for, for gas impermeability)
IT Vapor deposition processes
(vacuum, of ceramic films, on transparent plastic film, **app**. for, for gas impermeability)
IT 113443-18-8, Silicon oxide (SiO)
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(film deposition of, on transparent plastic film, **app**. for, for gas impermeability)
IT 25610-19-9, Polyethylene phthalate
RL: USES (Uses)
(film, depositing of oxide ceramic film on, **app**. for, for gas impermeability)
IT 25610-19-9, Polyethylene phthalate
RL: USES (Uses)
(film, depositing of oxide ceramic film on, **app**. for, for gas impermeability)

L85 ANSWER 20 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1993:49822 Document No. 118:49822 **Plasma** chemical vapor deposition **apparatus**. Mori, Kazumi (Ishikawajima-Harima Heavy Industries Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 04198483 A2 19920717 Heisei, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1990-333383 19901129.
AB The **app**. has **dual nozzle** pipe(s) with a no. of openings on its inner pipe for supply of different gases through its inner and outer pipe(s) and mixt(s). thereof into the chamber, and means for generation of a **plasma** in the vicinity of the substrate and a microwave **plasma** of 1 of source gases before introduction thereof into the chamber. Formation of reaction byproducts in the nozzle pipe is suppressed.
IC ICM C23C016-50
CC 75-1 (Crystallography and Liquid Crystals)
ST **plasma** chem **vapor** deposition **dual nozzle**
IT Vapor deposition processes
(**app**., chem., **plasma**, with **dual nozzle** pipes)
IT Vapor deposition processes
(**app**., chem., **plasma**, with **dual nozzle** pipes)

L85 ANSWER 21 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1991:418067 Document No. 115:18067 Collisionally excited XUV and VUV coherent sources. Wisoff, P. J. (Dep. Electr. Comput. Eng., Rice Univ., Houston, TX, USA). Report, AFOSR-TR-90-0809; Order No. AD-A224728, 46 pp. Avail. NTIS From: Gov. Rep. Announce. Index (U. S.) 1990, 90(23), Abstr. No. 061,840 (English) 1990.
AB Three types of excitation were explored including soft x-ray pumping from laser-produced **plasmas**, electron beam **pumping**, and pulsed **jet discharge pumping**. Using the laser produced **plasmas**, new quasimetastable states of barium

which radiate in the XUV are explored and new VUV radiating mols. were produced. Electron beam pumping has also resulted in the formation of ionic excimer mols. which radiate in the VUV, and considerable kinetic studies were performed to examine the feasibility of producing a VUV laser by this technique. This included the development of the necessary technol. to allow electron beam pumping of reactive vapors at approx. 700.degree. and still maintaining compatibility with VUV detection **equipment**. Using the third excitation technique, pulsed **jet discharge pumping**, the formation of highly excited ions from the sputtering of low vapor pressure materials used in the pulsed jet nozzle were studied.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

L85 ANSWER 22 OF 24 HCAPLUS COPYRIGHT 2002 ACS

1990:604121 Document No. 113:204121 Investigations into the direct analysis of semiconductor grade gases by inductively coupled **plasma** mass spectrometry. Hutton, Robert C.; Bridenne, M.; Coffre, E.; Marot, Y.; Simondet, F. (VG Elemental Ltd., Winsford/Cheshire, CW7 3BX, UK). Journal of Analytical Atomic Spectrometry, 5(6), 463-6 (English) 1990. CODEN: JASPE2. ISSN: 0267-9477.

AB Silane is the main gas used in the field of electronics to produce compds. of silicon. The direct anal. of silane by inductively coupled **plasma** mass spectrometry has been a practical proposition for both the measurement and indentification of elemental impurities at the sub-ppb level. Several steps, however, need to be taken to optimize com. **instrumentation** further for this task. First, to minimize the amt. of matrix material being deposited on the sampler orifice, an alloy sample cone was used which operated at a higher temp. than that of the com. available nickel cones; addnl., the optimum carrier gas flow-rate with silane was significantly lower than that required to achieve max. sensitivity in argon alone. This too reduced sample deposition around the orifice. A further increase in sensitivity was achieved when the argon carrier **gas** was **supplemented** by the **addn**. of hydrogen; the detection limits for 75As and 127I were 0.55 and 0.65 ppb, resp., with a precision of 2-5%. In order to quantify impurities in the silane 2 techniques were employed. The 1st used the silicon matrix as an internal std. and the 2nd involved direct comparison with a calibration graph obtained by the addn. of impurities to the silane.

CC 79-6 (Inorganic Analytical Chemistry)

ST silane analysis **plasma** mass spectrometry; arsenic detn silane **plasma** mass spectrometry; iodine detn silane **plasma** mass spectrometry; gas analysis **plasma** mass spectrometry

IT Gas analysis
(by inductively coupled **plasma** mass spectrometry)

IT Trace elements, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, by inductively coupled **plasma** mass spectrometry)

IT 1333-74-0, Hydrogen, uses and miscellaneous
RL: USES (Uses)
(argon carrier gas with addn. of, for sensitivity increase in **plasma** mass spectrometric detn. of arsenic and iodine in silane)

IT 7803-62-5, Silane, analysis
RL: ANST (Analytical study)
(arsenic and iodine trace detn. in, by inductively coupled **plasma** mass spectrometry)

IT 7440-38-2, Arsenic, analysis 7553-56-2, Iodine, analysis
RL: ANST (Analytical study)
(detn. of trace, in silane by inductively coupled **plasma** mass

spectrometry)

L85 ANSWER 23 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1986:99499 Document No. 104:99499 **Plasma** chemical vapor deposition **apparatus** for electrophotographic drum preparation. Matsuyama, Toshiro; Kojima, Yoshimi; Hayakawa, Hisashi (Sharp Corp., Japan). Jpn. Kokai Tokkyo Koho JP 60191270 A2 19850928 Showa, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1984-48369 19840313.
AB A capacitance-coupled type high frequency **plasma** chem. vapor deposition **app**. for prepn. of electrophotog. photoreceptor drums is claimed in which the distance between the high frequency electrode (i.e. counter electrode) and the inner surface of the **vacuum** container is **made** very small (.ltoreq. **several** mm).
IC ICM G03G005-082
ICS C23C016-00
CC 74-3 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
ST **plasma** chem vapor deposition **app**; electrophotog drum prepn **app**
IT Photography, electro-, plates
(drums, **plasma** chem. vapor deposition **app**. for prepn. of)

L85 ANSWER 24 OF 24 HCAPLUS COPYRIGHT 2002 ACS
1982:462560 Document No. 97:62560 The mechanical design of the vacuum system for the Tandem Mirror Experiment Upgrade. Lang, D. D.; Calderon, M. O.; Thomas, S. R.; Garner, D. R. (Lawrence Livermore Natl. Lab., Univ. California, Livermore, CA, 94550, USA). Proc. Symp. Eng. Probl. Fusion Res., 9th(2), 1569-72 (English) 1981. CODEN: PSERDR. ISSN: 0145-5958.
AB The Tandem Mirror Expt. Upgrade (TMX Upgrade) vacuum system uses most of the vacuum system from the original TMX and substantially increases its capabilities. The vacuum system provides the main structure for the exptl. **app**. as well as providing and maintaining the vacuum environment. The vacuum vessel provides the structure supporting all magnets, as they are contained inside the vacuum vessel, all of the neutral-beam injectors, and the various diagnostics. The vessel provides the main vacuum enclosure and the various access ports required by the magnet system, injector system, internal vacuum system, and **plasma** diagnostics. The **vacuum** environment is **created** and maintained by **two** systems, the external vacuum system and the internal vacuum system. The external system consists of mech. pumps, turbopumps, and cryopumps and creates a vacuum inside the vessel down to a min. pressure of 10-6 torr. The internal vacuum system further reduces the pressure into the 10-8 torr range and provides the fast pumping required to handle the excess gas from the neutral-beam injector system during a **plasma** shot. The internal vacuum system consists of Ti sublimators and **liq. N** liners that sep. the vacuum vessel into various pumping regions.
CC 71-2 (Nuclear Technology)
Section cross-reference(s): 47
IT Vacuum **apparatus**
(for tandem mirror nuclear fusion expt. TMX Upgrade)

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APR 1973 TO JUNE 28, 2002
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onger be valid. SEE HELP RLO for details <<<

=> d L114 1-24 ibib abs ind

L114 ANSWER 1 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 2002-134020 JAPIO
TITLE: **APPARATUS** FOR INTRODUCING/EXHAUSTING **PLASMA** DISPLAY PANEL GAS AND GAS FILLING METHOD USING THE SAME
INVENTOR: KONISHI YASUO
PATENT ASSIGNEE(S): NEC CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2002134020	A	20020510	Heisei	H01J009-38

APPLICATION INFORMATION
STN FORMAT: JP 2000-322498 20001023
ORIGINAL: JP2000322498 Heisei
PRIORITY APPLN. INFO.: JP 2000-322498 20001023
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002
AN 2002-134020 JAPIO
AB PROBLEM TO BE SOLVED: To boost cleaning efficiency of a **plasma** display panel(PDP) by reducing a cleaning gas conductance during gas cleaning of the inside of the display panel before discharge gas filling.
SOLUTION: An **apparatus** for **introducing** and exhausting PDP **gases** comprises: a cleaning-**gas-introducing** device 20, which **supplies** cleaning **gas** to a sealed panel 9; an exhausting/**discharge-gas-introducing** device 30, which evacuates the sealed panel 9 to a specified vacuum level by an **exhausting pump** 34, to **supply** a **discharge gas;** an oven 40, which heats the sealed panel 9; a **controller** 50, which **controls** an exhausting valve 32 and **gas introducing** valves 21, 35 to open and close; and a panel destruction preventing mechanism 7, which is located in the oven 40 and presses the both surfaces of the sealed panel 9 from the outside, to keep deflections to the both surfaces of the panel less than the destruction limit of the panel. During the gas cleaning, the pressure in the panel is **controlled** between 101324.72 to 102337.97 Pa., for the cleaning gas conductance in the panel to be prevented from decreasing.
COPYRIGHT: (C)2002,JPO
IC ICM H01J009-38
ICS B08B005-00; B08B005-04; G09F009-00; H01J009-385; H01J009-395; H01J011-02

L114 ANSWER 2 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 2002-088486 JAPIO
TITLE: HIGH-FREQUENCY INDUCTION HEAT **PLASMA APPARATUS**
INVENTOR: NAGAYA SHIGEO; KOMAKI HISASHI
PATENT ASSIGNEE(S): CHUBU ELECTRIC POWER CO INC
JEOL LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2002088486	A	20020327	Heisei	C23C026-00

APPLICATION INFORMATION
STN FORMAT: JP 2000-278273 20000913
ORIGINAL: JP2000278273 Heisei
PRIORITY APPLN. INFO.: JP 2000-278273 20000913
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002
AN 2002-088486 JAPIO
AB PROBLEM TO BE SOLVED: To achieve high-speed thick film synthesis or to obtain a large volume of super fine particles.
SOLUTION: A vessel 25A with solvent stored therein, vessels 25B, 25C and 25D with single phase solutions different from each other stored therein, and valves 26A, 26B, 26C and 26D for **controlling** the flow rates of the solutions from the vessels are provided. Output line tubes of the valves are collected in one place and integrated with each other. A buffer 20, a pump 28 and a mixer 29 are disposed in this order in the middle of the integrated line tube with spaces therebetween. By **controlling** the opening/closing degree of each valve, the composition ratio and concentration of the liquid mixture can be adjusted, and each solution is sucked and **discharged** by the **pump** 28. Each solution is mixed by the mixer 29 so that the liquid mixture is sprayed into a torch 1 from a nozzle-like tip of a tube 51 for **introducing** spray **gas**.

IC ICM C23C026-00
ICS B01J019-08; C23C016-448; H05H001-46

L114 ANSWER 3 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 2001-274151 JAPIO
TITLE: **PLASMA** PROCESSING **APPARATUS** AND METHOD, AND **GAS SUPPLY** RING AND DIELECTRIC
INVENTOR: HONGO TOSHIAKI; OSAWA SATORU
PATENT ASSIGNEE(S): TOKYO ELECTRON LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2001274151	A	20011005	Heisei	H01L021-31

APPLICATION INFORMATION
STN FORMAT: JP 2000-85351 20000324
ORIGINAL: JP2000085351 Heisei
PRIORITY APPLN. INFO.: JP 2000-85351 20000324
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
AN 2001-274151 JAPIO
AB PROBLEM TO BE SOLVED: To provide a **plasma** processing **apparatus** and method which can process an object to be processed with high quality by removing impurities.
SOLUTION: The **plasma** processing **apparatus** includes a processing chamber for performing prescribed **plasma** processing operations to an object to be processed, a **gas supply** mechanism for **supplying** a **gas** for processing of the object, a first vacuum pump connected to the processing chamber and having a vacuum state kept therein, and a **second** vacuum **pump** connected to the **gas supply** mechanism for evacuating

the **gas** **supply** mechanism.

IC ICM H01L021-31
ICS B01J019-08; C23C016-511; H01L021-3065

L114 ANSWER 4 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 2001-210624 JAPIO
TITLE: **PLASMA** TREATMENT **APPARATUS** FOR WORK AND **PLASMA** TREATMENT METHOD
INVENTOR: HAJI HIROSHI; ARITA KIYOSHI
PATENT ASSIGNEE(S): MATSUSHITA ELECTRIC IND CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2001210624	A	20010803	Heisei	H01L021-3065

APPLICATION INFORMATION
STN FORMAT: JP 2000-16765 20000126
ORIGINAL: JP2000016765 Heisei
PRIORITY APPLN. INFO.: JP 2000-16765 20000126
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
AN 2001-210624 JAPIO
AB PROBLEM TO BE SOLVED: To provide a **plasma** treatment **apparatus** and method which uses a vacuum suction means as the means for fixing a work of the object of **plasma** treatment.
SOLUTION: An upper electrode 2 and a lower electrode 3 are provided in a vacuum chamber 1. A suction hole 17 in the lower electrode 3 is evacuated by a first pump 21, and a work is fixed on the lower electrode 3. Then the vacuum chamber 1 is evacuated by a **second** vacuum **pump** 26, and a **plasma** generation **gas** is **supplied** to execute **plasma** treatment, while maintaining the vacuum pressure of the vacuum chamber 1 within a range of **plasma** treatment pressure. When **plasma** treatment has finished, the supply of the **plasma** generation gas is stopped, and first the vacuum chamber 1 should be returned to atmospheric pressure, and secondly, the absorbing hole 17 should is returned to the atmospheric pressure.

IC ICM H01L021-3065
ICS C23C016-02; C23F004-00; H05H001-46

L114 ANSWER 5 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1999-269643 JAPIO
TITLE: DEPOSITION **APPARATUS** AND DEPOSITION METHOD USING THE SAME
INVENTOR: HIOKI TAKESHI; AKIYAMA MASAHIKO; UEDA TOMOMASA; FUKUDA YOKO; ONOZUKA YUTAKA
PATENT ASSIGNEE(S): TOSHIBA CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 11269643	A	19991005	Heisei	C23C014-34

APPLICATION INFORMATION
STN FORMAT: JP 1998-72821 19980320
ORIGINAL: JP10072821 Heisei
PRIORITY APPLN. INFO.: JP 1998-72821 19980320
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined

Applications, Vol. 1999
AN 1999-269643 JAPIO
AB PROBLEM TO BE SOLVED: To obtain a film which is highly crystallized without heating a substrate to a high temp. and into which reactive gases, such as oxygen, are sufficiently taken, by disposing an ionization energy supplying means capable of independently **controlling** energy supply between the target material and substrate holding part of a deposition **apparatus** by a sputtering method.
SOLUTION: The substrate 12 and a target 15 (TiO<SB>2</SB>) are respectively installed at holding sections 13, 16 and thereafter the inside of a sputtering chamber is evacuated and only the **gaseous** Ar is **introduced** therein to form a **plasma** and to execute cleaning. The **plasma** energy supplying means including a **coil** 181 functions as an Ar ions forming source for cleaning. The shutter between the **substrate** 12 and the **coil** 181 is thereafter closed and the electric power supply from power sources 14, 17 is stopped. A gaseous mixture composed of Ar and oxygen is then **introduced** from a **gas introducing** port 22 and after the pressure in a vacuum vessel is regulated, the **plasma** ionization state in the **coil** 181 is regulated by a power source 19 and the deposition is executed by opening the shutter after making of the prescribed electric power from the power source 17 and making of RF electric power from the power source 12.
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IC ICM C23C014-34
ICS H01L021-203

L114 ANSWER 6 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1999-172416 JAPIO
TITLE: VACUUM VAPOR DEPOSITION AND FORMATION OF ITO FILM USING THE SAME
INVENTOR: KAWAMOTO SHINJI; OGINO ETSUO; WADA SHUNJI; AOKI YUICHI
PATENT ASSIGNEE(S): NIPPON SHEET GLASS CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 11172416	A	19990629	Heisei	C23C014-08

APPLICATION INFORMATION
STN FORMAT: JP 1997-340017 19971210
ORIGINAL: JP09340017 Heisei
PRIORITY APPLN. INFO.: JP 1997-340017 19971210
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1999
AN 1999-172416 JAPIO
AB PROBLEM TO BE SOLVED: To obviate the occurrence of a microparticle defect in a film at the time of depositing an ITO film at a high speed by vacuum vapor deposition using a high-density **plasma** arc.
SOLUTION: The arrangement relation of the evacuation port 9, anode crucible 7 and **gas introducing** port 10 of an arc **plasma** vacuum vapor deposition **apparatus** is so determined that the **gas introducing** port is disposed in a direction parting of the flow direction of the **introduced** **gas** to the evacuation port from a substrate 15 and that the respective projection positions of the **gas introducing** port, the anode crucible and the evacuation port in a base direction are arranged to hold the anode crucible. The vapor deposition is preferably executed in the atmosphere in which the total effective discharge rate S (little/ **second**) of the evacuation **pump** and the

quantity Q of the **gas** (sccm) to be **introduced** from the
gas introducing port are respectively specified to
S>=1500 and 0.018>=Q/S>=0.001.

IC ICM C23C014-08
ICS C23C014-28

L114 ANSWER 7 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1999-040544 JAPIO
TITLE: REACTIVE ION ETCHING **EQUIPMENT**
INVENTOR: CHIN TAKASHI; ITO MASAHIRO; HAYASHI TOSHIO
PATENT ASSIGNEE(S): ULVAC JAPAN LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 11040544	A	19990212	Heisei	H01L021-3065

APPLICATION INFORMATION
STN FORMAT: JP 1997-193951 19970718
ORIGINAL: JP09193951 Heisei
PRIORITY APPLN. INFO.: JP 1997-193951 19970718
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1999
AN 1999-040544 JAPIO
AB PROBLEM TO BE SOLVED: To form **plasma** of high evenness for highly even etching, by allocating a **plasma** generating high frequency **coil** in parallel, providing high frequency electric power introduction and leading-out parts for the high frequency **coil** in symmetric about a center, and applying a high frequency electric power through a phase **control** coupling part.
SOLUTION: High frequency **antennas** 3 for generating **plasmas** in a vacuum chamber 1 are symmetrically allocated in parallel, and connected to a **plasma** generating high frequency power source 5 through a phase **control** coupling part 4, for generating a **discharge plasma** in a **plasma** generating part 1a at the upper part of the vacuum chamber 1. A top plate 6 of the **plasma** generating part 1a at the upper part of the vacuum chamber 1 is tightly attached, sealed up, to an upper part flange of a side wall 2, while a **gas introduction** opening 7 for **introducing** etching **gas** in the vacuum chamber 1 is provided at a periphery part of the top plate 6. The **gas introduction** opening 7 is connected to an etching **gas supply** source through a **gas supply** channel and a **gas** flow rate **controller** for **controlling** the flow rate of etching gas.

IC ICM H01L021-3065
ICS H01J037-32; H05H001-46

L114 ANSWER 8 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1997-143675 JAPIO
TITLE: METHOD FOR REMOVING MOISTURE FOR VACUUM TREATING **APPARATUS**
INVENTOR: TANAKA MASARU
PATENT ASSIGNEE(S): SUMITOMO HEAVY IND LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC

JP 09143675	A	19970603	Heisei	C23C014-00

APPLICATION INFORMATION
STN FORMAT: JP 1995-297151 19951115
ORIGINAL: JP07297151 Heisei
PRIORITY APPLN. INFO.: JP 1995-297151 19951115
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1997

AN 1997-143675 JAPIO

AB PROBLEM TO BE SOLVED: To provide a method for removing moisture (device applying this method) for a vacuum treating **apparatus** capable of easily and rapidly removing moisture without requiring a special device.
SOLUTION: This **plasma** type vacuum vapor deposition **apparatus** is provided with a gas flow inlet 2b for admitting a dry gas DG into a vacuum chamber at a vacuum vessel 2 and is so constituted that the dry gas DG is admitted into the vacuum chamber while its flow rate is **controlled** by a **gas introducing** flow rate **controller** 10 through this gas inlet 2b. The sample used with this **apparatus** is a film sheet 6 taken up on a take-up drum 5. The **apparatus** has a steering coil 3 having a variable power source and vacuum vapor deposition is executed in the vacuum chamber by using a **plasma** generator 1 and an anode 7. The flow rate of the dry gas DG is **controlled** by the **gas introducing** flow rate **controller** 10 and the gas is admitted into the vacuum chamber while the gas is **discharged** by a **pump** 9 from the **discharge** port 2a before the treatment of the vacuum vapor deposition.

IC ICM C23C014-00
ICS C23C014-54

L114 ANSWER 9 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1996-199377 JAPIO
TITLE: **PLASMA** ETCHING **APPARATUS** AND **PLASMA** ETCHING
INVENTOR: FUKUDA SEIICHI
PATENT ASSIGNEE(S): SONY CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 08199377	A	19960806	Heisei	C23F004-00

APPLICATION INFORMATION
STN FORMAT: JP 1995-8610 19950124
ORIGINAL: JP07008610 Heisei
PRIORITY APPLN. INFO.: JP 1995-8610 19950124
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996

AN 1996-199377 JAPIO

AB PURPOSE: To provide a **plasma** etching **apparatus** and **plasma** etching method capable of arbitrarily **controlling** the taper angle of the side wall of a connecting hole opened in interlayer insulating films of a silicon oxide system with high accuracy.
CONSTITUTION: **Plasma** etching is executed while both of the **supply** rate and **discharge** rate of the etching **gas** from a **gas introducing** hole 6 are **controlled** by using a turbo molecule **pump** 8 variable in **discharge** rate, etc. The stagnation time of the etching gas in the chamber 4 is **controlled** to mainly **control** the

deposition quantity of the protective films of the side wall. As a result, the desired **control** of the taper angle of the side wall of the connecting hole is made possible.
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IC ICM C23F004-00
ICS C30B025-14; H01L021-3065; H01L021-31

L114 ANSWER 10 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1994-124902 JAPIO
TITLE: **PLASMA** PROCESSING **APPARATUS** WITH PARTICLE MONITOR
INVENTOR: NAKAHIGASHI TAKAHIRO; KUWABARA SO
PATENT ASSIGNEE(S): NISSIN ELECTRIC CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 06124902	A	19940506	Heisei	H01L021-205

APPLICATION INFORMATION
STN FORMAT: JP 1992-272716 19921012
ORIGINAL: JP04272716 Heisei
PRIORITY APPLN. INFO.: JP 1992-272716 19921012
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994

AN 1994-124902 JAPIO

AB PURPOSE: To provide a **plasma** processing device with a particle monitor which can observe the status of in-**plasma** particles to suppress the generation of in-**plasma** particles, or, once generated, to discharge as many particles as possible to outside the chamber, or to **control** at least one of the exhaust means, process **gas introducing** means and highfrequency voltage impressing means so that both can be accomplished.
CONSTITUTION: A substrate 90 to be processed is installed in either a high-frequency electrode 2 or an electrode 3 of earth potential at an opposite position which are installed in a **plasma** processing chamber 1. While a preset processing degree of vacuum is maintained in a chamber 1 by an **exhaust pump** 52, a process **gas** is **introduced** in between electrodes 2 and 3 and a high-frequency voltage is impressed to the high-frequency electrode 2 to convert the gas into **plasma**. This **plasma** processing **apparatus** provides **plasma** processing to the substrate 90 by exposing the substrate 90 to **plasma** and is equipped with a CCD camera 6 to observe a **plasma** generating region in the **plasma** processing chamber 1.
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IC ICM H01L021-205
ICS C23C016-50; C23C016-52; C23F004-00; H01L021-302

L114 ANSWER 11 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1993-136089 JAPIO
TITLE: MICROWAVE **PLASMA** ETCHING **APPARATUS** AND ETCHING METHOD THEREFOR
INVENTOR: TSUJIMOTO KAZUNORI; TAJI SHINICHI; ARAI MAKOTO
PATENT ASSIGNEE(S): HITACHI LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 05136089	A	19930601	Heisei	H01L021-302

APPLICATION INFORMATION
STN FORMAT: JP 1991-46331 19910312
ORIGINAL: JP03046331 Heisei
PRIORITY APPLN. INFO.: JP 1991-46331 19910312
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993
AN 1993-136089 JAPIO
AB PURPOSE: To obtain a microwave **plasma** etching **apparatus** in which a high density **plasma** is obtained in a wide range in a discharge tube by providing **control** means for varying a magnetic field distribution in a gas **plasma** timingly.
CONSTITUTION: A microwave excited by a magnetron 4 is propagated to a quartz discharge tube 16 through a waveguide 5, and etching **gas introduced** from a **gas** switching **control** system 6 is excited by a microwave to become a **plasma** 1. A wafer 8 mounted on a sample base 7 is exposed, and **plasma**- processed. **Liquid nitrogen** 10 can be so supplied from a vessel 11 as to **cool** the wafer 8 to a **low temperature**. A heater 9 is provided on the base 7. The wafer is introduced from a sample replacing chamber 2 into a processing chamber 17 through a gate valve 3. Upper, intermediate and lower stage **coils** 12, 13, 14 are mounted on annular solenoid **coil** at the outside of the tube. A voltage to be applied to the **coils** is supplied from a power source 15, and a timing change of the voltage is **controlled** by a **control** circuit 18.
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IC ICM H01L021-302
ICS C23F004-00; G01N024-14; G01R033-64; H05H001-46
ICA H01L021-31

L114 ANSWER 12 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1993-117867 JAPIO
TITLE: METHOD AND **APPARATUS** FOR PRODUCING SILICON OXIDE FILM
INVENTOR: SHIMIZU AKIO; TSUJI NAOTO
PATENT ASSIGNEE(S): FUJI ELECTRIC CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 05117867	A	19930514	Heisei	C23C016-50

APPLICATION INFORMATION
STN FORMAT: JP 1992-5249 19920116
ORIGINAL: JP04005249 Heisei
PRIORITY APPLN. INFO.: JP 1991-220810 19910902
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993
AN 1993-117867 JAPIO
AB PURPOSE: To obtain the process for production which can form films which are excellent in a film thickness distribution, symmetrical uniformity of the covering of step parts and particularly water permeation resistance as the process for production of the silicon oxide films by using an ECR **plasma** CVD device.
CONSTITUTION: This method consists in forming the films by setting the gaseous pressure in the device within a range from 7×10<SP>-3</SP> to 1×10<SP>-1</SP> Torr and impressing high-frequency electric power to a substrate. Further, a cusp magnetic field is formed to exceedingly improve the water permeation resistance of the films by the synergistic

effect of the high-frequency electric field and the cusp magnetic field. The **control** of the gaseous pressure in the device is executed by **control** of the sectional area of the flow passage on a **gas discharge** pipe side, **introduction** of **another gas** to the mid-way of the discharge pipe, **control** of the rotating speed of a vacuum pump, et. The substrate side end face of a sub-solenoid 13 is disposed apart >=10cm from the substrate 10 in such a manner that the cusp surface exists within 10cm on both sides of the substrate 10.

IC ICM C23C016-50
ICS H01L021-205; H01L021-31; H01L021-316

L114 ANSWER 13 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1993-036607 JAPIO
TITLE: DEPOSITION FILM FORMING METHOD
INVENTOR: OTOSHI HIROKAZU; TAKAI YASUYOSHI; OKAMURA TATSUJI; TAKEI TETSUYA
PATENT ASSIGNEE(S): CANON INC
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 05036607	A	19930212	Heisei	H01L021-205

APPLICATION INFORMATION
STN FORMAT: JP 1991-189992 19910730
ORIGINAL: JP03189992 Heisei
PRIORITY APPLN. INFO.: JP 1991-189992 19910730
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993

AN 1993-036607 JAPIO

AB PURPOSE: To eliminate deterioration of oil of a rotary pump which causes failure and periodic cleaning of a vacuum exhaust **equipment**, in deposition film formation by a **plasma** CVD method.
CONSTITUTION: The exhaust system of a reaction vessel 101 is constituted of the following two systems which are mutually independent; the first system consisting of an oil diffusion pump 102, a booster pump 103 and a rotary **pump** 104, and the **second** system consisting of a booster pump 103' and a rotary pump 104'. In the case of **introducing** material **gas**, the first system is used for exhaust. In the other cases, the second system is used for exhaust.

IC ICM H01L021-205
ICS H01L021-285

L114 ANSWER 14 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1992-192326 JAPIO
TITLE: **PLASMA** REACTION **EQUIPMENT**
INVENTOR: YONEDA MASAHIRO
PATENT ASSIGNEE(S): MITSUBISHI ELECTRIC CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 04192326	A	19920710	Heisei	H01L021-302

APPLICATION INFORMATION
STN FORMAT: JP 1990-183392 19900710
ORIGINAL: JP02183392 Heisei

PRIORITY APPLN. INFO.: JP 1990-183392 19900710
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1992
AN 1992-192326 JAPIO
AB PURPOSE: To restrain reaction products from adhering to the inner wall of a chamber, and improve the **controllability** of etching reaction, by constituting a chamber in a **double** structure, and **introducing** rare **gas** into a chamber from the inner wall.
CONSTITUTION: In a chamber 11, a space 13 is formed with a chamber inner wall 14 serving as a **gas introducing** inlet. From a rare **gas introducing** inlet 12, inert **gas** like argon is **introduced** into the space 13 inside the chamber inner wall 11. From a flow in port formed on the chamber inner wall 14 serving as the **gas introducing** inlet inside the chamber wall 11, argon gas flows in the chamber. In the vicinity of the chamber inner wall 14 serving as the **gas introducing** inlet, the partial pressure of the argon gas is high, and **plasma** similar to argon gas **plasma** is generated. Hence the partial pressure of reaction products generated from a substrate 7 to be treated and the reaction **gas introduced** from a **gas introducing** inlet 4 becomes low in the vicinity of the chamber wall 11, so that the reaction products are hard to adhere to the chamber wall 11.

IC ICM H01L021-302
ICS H01L021-205

L114 ANSWER 15 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1988-194326 JAPIO
TITLE: MANUFACTURE OF SEMICONDUCTOR DEVICE
INVENTOR: HIRAO TAKASHI; SETSUNE KENTARO; YOSHIDA TETSUHISA
PATENT ASSIGNEE(S): MATSUSHITA ELECTRIC IND CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 63194326	A	19880811	Showa	H01L021-265

APPLICATION INFORMATION
STN FORMAT: JP 1987-26677 19870206
ORIGINAL: JP62026677 Showa
PRIORITY APPLN. INFO.: JP 1987-26677 19870206
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1988
AN 1988-194326 JAPIO
AB PURPOSE: To enable the uniform and easy **control** of impurity introduction in a great area silicon thin film, etc. by introducing hydrogen and group III or group V elements selectively by using a mask formed on the silicon thin film by accelerating the ion from **plasma** space.
CONSTITUTION: A 2 % PH<SB>3</SB> gas diluted with, e.g., hydrogen and **introduced** from a **gas** pipe 12 is maintained to a level of, e.g., 10<SP>-4</SP> Torr being **exhausted** by a vacuum **pump** VP. For example, a 13.56 MHz high frequency electrode 2 and an electromagnet 3 installed outside a quartz tube (vacuum container) 1 excite and discharge and **plasma** P which contains at least a phosphorus ion 4 and a hydrogen ion 5 is formed. These ions are drawn in a processing chamber by voltage of approx. 1∼10 kV and are irradiated like a shower on a great area integrated elements 10 heated to a definite temperature. This **equipment** can make batch processing over a

great area and in the case of implanting an impurity in a thin film transistor which is integrated to a size of A4 by using amorphous silicon, e.g., the processing time is approx. 1 minute. The structure of the **equipment** is also simple and convenient.
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IC ICM H01L021-265
ICS H01L021-22; H01L027-12; H01L029-78

L114 ANSWER 16 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1987-001730 JAPIO
TITLE: **PLASMA** TREATING **APPARATUS**
INVENTOR: AKATSUKA ETSUO; KASAI JUNICHI
PATENT ASSIGNEE(S): ISUZU MOTORS LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 62001730	A	19870107	Showa	C08J007-00

APPLICATION INFORMATION
STN FORMAT: JP 1985-140242 19850628
ORIGINAL: JP60140242 Showa
PRIORITY APPLN. INFO.: JP 1985-140242 19850628
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1987

AN 1987-001730 JAPIO

AB PURPOSE: To continuously carry out **plasma** treatment with good operability and treatment efficiency, by charging a material to be treated into a closable container having a valved piping for gas suction and **discharge** and **plasma introduction** and moving the container from a previous vacuum zone, **plasma** treating zone and purging zone one after another.
CONSTITUTION: A material to be treated 7 (a molded resin article in the form of simple part) is charged into a container 1 having an outlet and inlet for the material to be treated 7, door part for closing the outlet and inlet and at least one valved piping for gas suction and **discharge** and **plasma introduction**, and the container 1 is placed on a transfer **apparatus** 6 for moving a given distance, stopping and further moving after a given time and evacuated to reduced pressure in a previous vacuum zone by a vacuum **pump** 2 one after **another**. A gas in the **plasma** state from a **plasma** generating part 3 is introduced into the container 1 in a **plasma** treating zone while evacuating the container 1 by a vacuum pump 2-6 to treat the material 7 for a given time and a purging gas 5 is made to flow into the container 1 to purge the interior thereof and take out the treated material 7.
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IC ICM C08J007-00
ICS B01J003-02; B01J019-08; B29C071-04

L114 ANSWER 17 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1986-094320 JAPIO
TITLE: THIN FILM FORMING **EQUIPMENT**
INVENTOR: KITAGAWA MASATOSHI; ISHIHARA SHINICHIRO
PATENT ASSIGNEE(S): MATSUSHITA ELECTRIC IND CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 61094320	A	19860513	Showa	H01L021-205

APPLICATION INFORMATION
STN FORMAT: JP 1984-216713 19841016
ORIGINAL: JP59216713 Showa
PRIORITY APPLN. INFO.: JP 1984-216713 19841016
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1986

AN 1986-094320 JAPIO

AB PURPOSE: To obtain a thin film at a high speed without reducing the temperature of the surface of a substrate by providing a heater adjacent to a raw material gas inlet which is also used as an electrode against the substrate when the thin film is formed by **plasma** decomposition applying voltage from outside to a vacuum **equipment** filled with a raw material gas.

CONSTITUTION: A substrate holder 24 which is also used as an electrode and the electrode 32 which is also used as a raw material gas inlet 28 are provided face to face in a vacuum chamber 21 which has an exhaust port 22 connected to a vacuum **exhaust pump** 23 on a bottom surface. A heater 26 connected to a power source 27 is housed in the holder 24 and a substrate 25 on which a thin film is grown is put on the bottom surface of the holder 24. A raw material **gas** is **supplied** to the electrode 32 from a cylinder 29 through a flow **control equipment** 30, ejected from the inlet 28 and in this state, a **plasma** generation source 34 is connected to the holder 24 and the electrode 32 and the thin film is formed by generated **plasma**. In this construction, a heater 31 connected to a power source 33 is also housed in the electrode 32 along the periphery and the thin film is obtained at a high speed without deteriorating the characteristics of the thin film.

IC ICM H01L021-205
ICS H01L021-31
ICA H01L031-04

L114 ANSWER 18 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1986-041764 JAPIO
TITLE: METHOD AND **APPARATUS** FOR VAPOR DEPOSITION UNDER VACUUM ARC REACTION
INVENTOR: SHINNO HITOSHI; FUKUTOMI KATSUO; FUJITSUKA MASAKAZU; OKADA MASATOSHI
PATENT ASSIGNEE(S): NATL RES INST FOR METALS
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 61041764	A	19860228	Showa	C23C014-24

APPLICATION INFORMATION
STN FORMAT: JP 1984-161599 19840802
ORIGINAL: JP59161599 Showa
PRIORITY APPLN. INFO.: JP 1984-161599 19840802
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1986

AN 1986-041764 JAPIO

AB PURPOSE: To improve ionization efficiency and to perform vapor deposition stably at high speed without contaminating a film, by **introducing** reaction **gas** through a small hole provided at a discharging surface of a cathode and converging a vacuum arc cathode base point to the circumference of the opening hole end.

CONSTITUTION: Small hole connecting a gas exit 4 and a gas inlet 5 is

provided at the discharging surface 3 of the cathode 2. Reaction gas is ionized by a **plasma** generating system 6 provided just before the exit 5, then sent from the inlet 5. The cathode 2 is covered with a shield 7 such as Ti maintaining a narrow gap excluding the **surface** 3. A converging **coil** 9 is provided at the outer circumference of a water **cooled** anode 8 in front of the cathode 2, to **control** arbitrarily **plasma** beam diameter by magnetic field. In this way, discharge is stabilized, **plasma** reaction efficiency is improved, and good quality ceramic cover can be vapor deposited at a high speed. Trouble of short circuit between cathode and anode due to shield material evaporation and conductive material adhesion is eliminated.
COPYRIGHT: (C)1986,JPO&Japio
IC ICM C23C014-24

L114 ANSWER 19 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1985-224706 JAPIO
TITLE: PRODUCTION OF ULTRAFINE METALLIC PARTICLES
INVENTOR: OKADA RYOJI; IBARAKI YOSHIAKI; HIOKI SUSUMU; ARAYA TAKESHI
PATENT ASSIGNEE(S): HITACHI LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 60224706	A	19851109	Showa	B22F009-12

APPLICATION INFORMATION
STN FORMAT: JP 1984-78405 19840420
ORIGINAL: JP59078405 Showa
PRIORITY APPLN. INFO.: JP 1984-78405 19840420
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1985
AN 1985-224706 JAPIO
AB PURPOSE: To provide an extremely narrow grain size distribution for optional grain sizes at about <=1μ grain size by entraining the ultrafine metallic particles formed by a hydrogen arc heating method in gaseous flow, evaporating the same again in a high temp. section and condensing the vapor by a **cooling** gas etc.
CONSTITUTION: A chamber 1 of an **apparatus** for producing ultrafine particles and a chamber 11 of a **control** device for grain size are evacuated to a vacuum and a gaseous mixture composed of H<SB>2</SB> and Ar is sealed into the chambers through **gas introducing** ports 7, 13, 14. Arc discharge is generated between an electrode 3 for discharge and a sample 4 and the generated ultrafine metallic particles are entrained in gaseous carrier flow G1 and are conducted to the chamber 11. A **plasma** column 16 is generated by the high-frequency magnetic field generated in a working **coil** 9 in the high-frequency **plasma** torch 8 of the chamber 11. The ultrafine metallic particles are fed to the tail flame part thereof from a nozzle 19 so that the particles are evaporated. The vapor is again condensed by the **cooling** gaseous flow G2 blown from a nozzle 15 and the generated ultrafine particles are sucked by a suction nozzle 10.
COPYRIGHT: (C)1985,JPO&Japio
IC ICM B22F009-12
ICS B22F009-14

L114 ANSWER 20 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1984-156427 JAPIO
TITLE: **PLASMA** TREATING **APPARATUS**

INVENTOR: KOYAMA TOMITARO
PATENT ASSIGNEE(S): SHIMADZU CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 59156427	A	19840905	Showa	B01J019-08

APPLICATION INFORMATION
STN FORMAT: JP 1983-31597 19830226
ORIGINAL: JP58031597 Showa
PRIORITY APPLN. INFO.: JP 1983-31597 19830226
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1984
AN 1984-156427 JAPIO
AB PURPOSE: To enhance the capacity of **plasma** treatment by making it possible to rapidly and efficiently **introduce gas**, by providing a gas separating means to the pipeline of a carrier **gas introducing** system.
CONSTITUTION: Electrodes 2 for generating a **plasma** phenomenon are opposedly arranged in a treating chamber 1 and electric energy is supplied to the electrodes 2 from a power source 3 while a separation means is provided to the **gas introducing** pipeline 18 between a main valve 16 and a flow **control** valve 11. The separation means consists of an upstream side nozzle 12, a downstream side nozzle 13, a surrounding device 14, an exhaust valve 17, a vacuum **pump** 15 and an **exhaustion** regulating valve 16. A space surrounding both nozzles 12, 13 is connected to a vacuum **pump** 15 through an **exhaust** pipe 17 to be evacuated.
COPYRIGHT: (C)1984,JPO&Japio
IC ICM B01J019-08

L114 ANSWER 21 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1984-045907 JAPIO
TITLE: METHOD AND **APPARATUS** FOR FORMING METALLIC OXIDE FILM
INVENTOR: WATANABE IWAO; YOSHIHARA HIDEO; MATSUO SEITARO
PATENT ASSIGNEE(S): NIPPON TELEGR & TELEPH CORP <NTT>
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 59045907	A	19840315	Showa	C01B013-28

APPLICATION INFORMATION
STN FORMAT: JP 1982-153852 19820906
ORIGINAL: JP57153852 Showa
PRIORITY APPLN. INFO.: JP 1982-153852 19820906
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1984
AN 1984-045907 JAPIO
AB PURPOSE: To form a dense metallic oxide film rapidly at a **low temperature**, by supplying the **plasma** stream of O<SB>2</SB> gas generated in the **plasma** generation chamber to the specimen chamber **introduced** with the **gas** of metallic halide compound, etc., thereby activating the gas with the **plasma**.
CONSTITUTION: O<SB>2</SB> gas or a mixture of O<SB>2</SB> and an inert **gas** is **introduced** into the **plasma** generation chamber 1 through the inlet pipe 8, and converted to the **plasma**

by the electron cyclotron resonance caused by the magnetic field generated by the magnetic **coil** 6 and the micro-wave radiation 5, and the produced **plasma** stream is introduced into the specimen chamber 2. Separately, the (organic) metal halide in the raw material vessel 23 is evaporated by heating with the heater 25, and the **vapor** is **introduced** into the **gas** reservior 21 through the **control** valve 22 and the inlet pipe 24. When the pressure of the vapor has reached a required level, the valve 27 is opened to **introduce** the **vapor** into the specimen chamber 2. The vapor is activated with the **plasma** stream, and a metallic oxide film is deposited to the surface of the specimen 13 on the specimen table 3.

IC ICM C01B013-28

ICA B01J019-08; C01F007-02; C01G001-02; C01G033-00; C01G035-00; C01G039-02; H05H001-00

L114 ANSWER 22 OF 24 JAPIO COPYRIGHT 2002 JPO

ACCESSION NUMBER: 1983-081975 JAPIO

TITLE: GAS LINE EXHAUST SYSTEM OF **PLASMA** ETCHING **APPARATUS** AND SIMILAR **APPARATUS**

INVENTOR: OKURA AKIMITSU; KATAGIRI SHINJIRO; OKUDAIRA SADAYUKI; NISHIMATSU SHIGERU; SUZUKI KEIZO

PATENT ASSIGNEE(S): HITACHI LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 58081975	A	19830517	Showa	C23F001-08

APPLICATION INFORMATION

STN FORMAT: JP 1981-179751 19811111

ORIGINAL: JP56179751 Showa

PRIORITY APPLN. INFO.: JP 1981-179751 19811111

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1983

AN 1983-081975 JAPIO

AB PURPOSE: To provide a **plasma** etching **apparatus** capable of carrying out **gas introduction** into an etching chamber smoothly, constituted by providing an exhaust **control** means for always holding the inside of the exhaust pipe of a **gas introducing** line under a clean state.

CONSTITUTION: To the **gas introducing** line 10 of this **plasma** etching **apparatus**, a supply source 17 of, for example, an O<SB>2</SB>-**gas** and a **supply** source 18 of, for example, an SnF<SB>6</SB> gas are respectively connected through opening and closing valves 11, 12 shielding the side of an etching chamber 7 and the side of a **gas introducing** port under a vacuum state, gas flow **control apparatuses** 13, 14 and inlet side valves 15, 16. In addition, a **control apparatus** 27 for **controlling** opening and closing conditions of the aforementioned valves 11, 12 and other valves is provided to the gas line. This **apparatus** 27 closes bypass valves 21, 22 exhaust valves 23, 24 when the valves 11, 12 are opened and opens the valves 23, 24 when the valves 11, 12 are closed to exhaust a necessary part in a gas exhaust pipe by a gas **exhaust pump** 25. In **addition**, when plural kinds of gases are flowed and one kind or plural kinds of gases are blocked rapidly, gas blocking can be carried out by closing the valves 11, 12 more rapidly compared to a case when the **apparatuses** 13, 14 are closed.

IC ICM C23F001-08

L114 ANSWER 23 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1981-087328 JAPIO
TITLE: SEMICONDUCTOR TREATMENT DEVICE
INVENTOR: YAMANAKA ITARU
PATENT ASSIGNEE(S): MATSUSHITA ELECTRONICS CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 56087328	A	19810715	Showa	H01L021-31

APPLICATION INFORMATION
STN FORMAT: JP 1979-164974 19791218
ORIGINAL: JP54164974 Showa
PRIORITY APPLN. INFO.: JP 1979-164974 19791218
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1981
AN 1981-087328 JAPIO
AB PURPOSE: To correct the fluctuations of **plasma** effect in the central part and the peripheral part by a method wherein the **supply** section of reaction **gas** is separated into two systems, i.e. the central part and peripheral part, and the **gas** amount to be **supplied** can respectively independently be **controlled**, in a **plasma** treating **apparatus**.
CONSTITUTION: A susceptor 2 holding a wafer 1 and a gas feeder 4 (4A, 4B) are both disc and arranged in parallel facing to each other in a reaction chamber. The gas feeder 4 is composed of **two gas supply** units 4A and 4B which respectively independently **control** a flow-rate of the reaction gases. A mass flow meter and needle valve etc. are employed for flow-rate regulating devices 7A, 7B. Thus, there can be corrected a nonuniformity in the treatment of **plasma** caused by the difference in the **plasma** effects in the central part and the peripheral part of the reaction chamber. For example, when a silicon nitride film is formed on the wafer 1 on the **plasma** treatment, the more reaction gases are made to be supplied to the peripheral part 4B rather than to the central part 4A.

IC ICM H01L021-31
ICS H01L021-30

L114 ANSWER 24 OF 24 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1979-142150 JAPIO
TITLE: METHOD AND **APPARATUS** FOR GENERATING **PLASMA** FLAME
INVENTOR: KOMEICHI SHIGEHIKO; YAOSAKA AKIRA; SAKUMA NOBUO
PATENT ASSIGNEE(S): AGENCY OF IND SCIENCE & TECHNOL
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 54142150	A	19791106	Showa	B23K009-00

APPLICATION INFORMATION
STN FORMAT: JP 1978-49720 19780428
ORIGINAL: JP53049720 Showa
PRIORITY APPLN. INFO.: JP 1978-49720 19780428
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined

Applications, Vol. 1979
AN 1979-142150 JAPIO
AB PURPOSE: To generate stable **plasma** flame as well as make the **control** of **plasma** flame easier by supplying concurrently a high temperature gas to the central part and also a **low temperature** gas to the circumferential part as working gases for **plasma** generator.
CONSTITUTION: The path 5 for inert gas is formed around the outside circumference of the internal electrode 2. From the blowing tube 11, a high temperature combustion gas is sent to the electrode nozzle 1a through the outside of the heat-resistant electrode protective cylinder 12 and at the same time a **low temperature** gas, e.g., CO<SB>2</SB>, etc., is sent from the **low temperature gas nozzle** 10 to the outside of the high temperature gas flow, where a **swirl** flow of the **low temperature gas** passes through the **nozzle** 1a while wrapping the high temperature gas and also wringing up the tip portion of the gas, whereby forming the **low temperature** layer 9 covering the arc 3 and the high temperature boundary layer 8. Even outside the nozzle 1a, the **low temperature** layer 9 gives the **plasma** flame a pich effect to stabilize the **plasma** flame, and also the heat loss of **plasma** flame due to the nozzle 1a can be reduced to rise the heat efficiency.
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IC ICM B23K009-00

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L115 ANSWER 1 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 2002-069664 JAPIO
TITLE: METHOD AND **APPARATUS** FOR **PLASMA** PROCESSING
INVENTOR: TAKIGAWA HIROSHI; NISHIMURA YOSHIMI
PATENT ASSIGNEE(S): TAKIGAWA HIROSHI
KURITA SEISAKUSHO:KK
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2002069664	A	20020308	Heisei	C23C026-00

APPLICATION INFORMATION
STN FORMAT: JP 2000-257117 20000828
ORIGINAL: JP2000257117 Heisei
PRIORITY APPLN. INFO.: JP 2000-257117 20000828
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002
AN 2002-069664 JAPIO
AB PROBLEM TO BE SOLVED: To provide a method and an **apparatus** for **plasma** processing by means of a vacuum arc **discharge** which **controls** the generation of a droplet.
SOLUTION: The **apparatus** for **plasma** processing comprises a chamber 1 for forming atmosphere of pressure of 10-4-10 Pa, in which workpieces 10 and 11 (for example, substrates) are arranged, a first **electrode** 2 and a second **electrode** 3 arranged to face each other in the chamber 1, an electric power 4 applying **discharge** electric power (for example, bipolar pulse voltage) to the first **electrode** 2 and the second **electrode** 3, an **electrode** transfer means 7 which is attached to the first

electrode 2 in order to adjust a space (d) between the first **electrode** 2 and the second **electrode** 3, electromagnetic **coils** 5 and 6 provided closely to the first **electrode** 2 and the second **electrode** 3, respectively, and **gas introducing** and delivering means **20** and 21 for **introducing** and delivering predetermined **gas** from and to the chamber 1.

IC ICM C23C026-00
ICS C23C014-24

L115 ANSWER 2 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 2001-332534 JAPIO
TITLE: **PLASMA** PROCESSING METHOD AND **PLASMA** PROCESSING **APPARATUS**
INVENTOR: HAYASHI SHIGENORI; KUBOTA MASABUMI
PATENT ASSIGNEE(S): MATSUSHITA ELECTRIC IND CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2001332534	A	20011130	Heisei	H01L021-3065

APPLICATION INFORMATION
STN FORMAT: JP 2000-154016 20000525
ORIGINAL: JP2000154016 Heisei
PRIORITY APPLN. INFO.: JP 2000-154016 20000525
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
AN 2001-332534 JAPIO
AB PROBLEM TO BE SOLVED: To highly precisely **control** reaction on the surface of a sample to be sampled with good reproducibility in a **plasma** processing method.
SOLUTION: Reactive **gas** is **introduced** into a chamber 10 kept in a vacuum state and **plasma** 23 constituted of reactive gas is generated by applying high frequency power to a **coil** 15 formed of a first high frequency power 17. A **plasma** processing is performed on the surface of a wafer **20** by using an ion species in **plasma** 23. The application period of a high level and the stop or the application period of a low level are alternately installed in the application state of high frequency power. Thus, the composition ratio of the ion species generated in **plasma** 23 and flied onto the surface of the wafer **20** is **controlled**.

IC ICM H01L021-3065
ICS C23C016-507; C23C016-52; C23F004-00; H05H001-46

L115 ANSWER 3 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1997-289193 JAPIO
TITLE: **PLASMA** GENERATING **EQUIPMENT** AND ITS METHOD, AND **PLASMA** TREATMENT **EQUIPMENT** AND ITS METHOD
INVENTOR: NAKAGAWA HIDEO
PATENT ASSIGNEE(S): MATSUSHITA ELECTRIC IND CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 09289193	A	19971104	Heisei	H01L021-3065

APPLICATION INFORMATION
STN FORMAT: JP 1996-101244 19960423
ORIGINAL: JP08101244 Heisei
PRIORITY APPLN. INFO.: JP 1996-101244 19960423
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1997
AN 1997-289193 JAPIO
AB PROBLEM TO BE SOLVED: To enable independently **controlling** the degree of dissociation of **plasma** used in **plasma** treatment and ion energy.
SOLUTION: A forming chamber 11 for forming **plasma** and a **plasma** treatment chamber 12 for performing **plasma** treatment are mutually independently installed and linked with each other via a **plasma** transport channel 13. A **gas introducing** means 15 for **introducing gas** is installed in the **plasma** forming chamber 11. An exhaust means 16 for discharging gas and a specimen stand 17 for holding a semiconductor wafer **20** are installed in the **plasma** treatment chamber 12. A first high frequency power supply 19 is connected with the specimen stand 17. An inductive coupling **coil** 22 is installed on the **plasma** forming chamber 11 via insulator 21. One end of the inductive coupling **coil** 22 is connected with a second high frequency power supply 23, and the other end is grounded. **Plasma** formed in the **plasma** forming chamber 11 is transported to the **plasma** treatment chamber 12 through the **plasma** transport channel 13, while the degree of dissociation is being decreased.
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IC ICM H01L021-3065
ICS C23C016-50; C23F004-00; H01L021-205; H05H001-46

L115 ANSWER 4 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1996-013151 JAPIO
TITLE: **PLASMA** CVD METHOD AND **APPARATUS** THEREFOR
INVENTOR: HARA TAMIO; HAMAGAKI MANABU; AOYANAGI KATSUNOBU; RIYUUJI MAKOTO; BAN MASAHITO; TOKAI MASAKUNI
PATENT ASSIGNEE(S): RIKAGAKU KENKYUSHO
KAWASAKI HEAVY IND LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 08013151	A	19960116	Heisei	C23C016-50

APPLICATION INFORMATION
STN FORMAT: JP 1994-165751 19940627
ORIGINAL: JP06165751 Heisei
PRIORITY APPLN. INFO.: JP 1994-165751 19940627
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996
AN 1996-013151 JAPIO
AB PURPOSE: To form films having good quality with good productivity at a low cost in a coating treatment of the films by a **plasma** CVD **apparatus** for works, such as wafers.
CONSTITUTION: The **plasma** CVD **apparatus** 1"' is provided with an electron beam gun 16 before this **apparatus** concentrically with a chamber 2 of a **plasma** forming region to increase the energy of an electron beam 35. The hardly ionizable gas of a **gaseous** mixture to be **supplied** is supplied from a port 29 near an acceleration electrode 25 and the easily ionizable **gas**

is **supplied** from a port 30 apart therefrom. Further, the quantity of the formed ions and free radicals is detected by a probe 34 and is fed back to an acceleration power source **20'** to **control** the energy of an electron beam and the current of a reverse magnetic field **coil** 31 is **controlled** to eliminate the magnetic fields, by which the films contg. the decreased secondary reaction products in the gas to be ionized and having the good quality are formed.

IC ICM C23C016-50
ICS C23C016-48; H01J027-20; H01J037-08; H01J037-317

L115 ANSWER 5 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1995-331447 JAPIO
TITLE: **PLASMA** CVD **APPARATUS**
INVENTOR: TERAYAMA NOBUYUKI; NAKASONE MASAMI
PATENT ASSIGNEE(S): SHINKO SEIKI CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 07331447	A	19951219	Heisei	C23C016-50

APPLICATION INFORMATION
STN FORMAT: JP 1994-148676 19940606
ORIGINAL: JP06148676 Heisei
PRIORITY APPLN. INFO.: JP 1994-148676 19940606
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995

AN 1995-331447 JAPIO

AB PURPOSE: To **control** the quality of films and a region where the films are formed on works by **controlling** the shape of **plasma**.
CONSTITUTION: This **plasma** CVD **apparatus** has a vacuum chamber 1, a **plasma** source 3 which is coupled to the vacuum chamber 1, generates the **plasma** and supplies the **plasma** into the vacuum chamber 1, holders 16, 16,... which are disposed apart a spacing from an axial line 14 to the center of the **plasma** flow and support the substrates 15, 15,..., a main **coil 20** which generates a magnetic field ϕ in the **plasma** source 3, an auxiliary **coil** 21 which generates a magnetic field ϕ<SB>1</SB> or ϕ<SB>2</SB> in the vacuum chamber 1 on the side opposite to the **plasma** source 3 and a **gas nozzle** 19 which **supplies gaseous** materials into the vacuum chamber 1. The main **coil 20** and the auxiliary **coil** 21 are separately driven by power source 20a and 21a for generating the magnetic fields, by which the shape of the **plasma** in the vacuum chamber 1 is **controlled**.

IC ICM C23C016-50

L115 ANSWER 6 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1995-249614 JAPIO
TITLE: **PLASMA** ETCHING METHOD AND ITS **EQUIPMENT**
INVENTOR: TOYODA KAZUYUKI; ISHIDA TAKESHIGE; TANAKA TSUTOMU; SUZUKI SADAYUKI
PATENT ASSIGNEE(S): KOKUSAI ELECTRIC CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 07249614	A	19950926	Heisei	H01L021-3065

APPLICATION INFORMATION
STN FORMAT: JP 1994-66821 19940310
ORIGINAL: JP06066821 Heisei
PRIORITY APPLN. INFO.: JP 1994-66821 19940310
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995
AN 1995-249614 JAPIO
AB PURPOSE: To obtain necessary etching characteristics by a method wherein high frequency power applied to a **plasma** generating **coil** is periodically modulated, and the percentage of excited species is **controlled** by changing electron temperature of **plasma**.
CONSTITUTION: In the **plasma** etching method wherein **plasma** is generated by applying high frequency power to a **plasma** generating **coil** 11, and etching is performed by using the **plasma**, the high frequency power to be applied to the **plasma** generating **coil** 11 is periodically modulated. For example, a cylinder 2 composed of insulating material is continuously connected with the upper part of a vacuum vessel 1 composed of conducting material, and the upper end of the cylinder 2 is closed with a lid 3. A **gas introducing** pipe 4 is interconnected with the lid 3, and a vacuum pump 6 is connected with the bottom surface of the vacuum vessel 1 through an **exhaust** pipe 5. A planar **electrode** 3 is formed inside the vacuum vessel 1. The **plasma** generating **coil** 11 is wound around the cylinder 2. A high frequency power supply **20** for the **coil** is provided with an oscillation part capable of outputting modulated high frequency power, and connected with the **coil** 11 through a matching device 19.
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IC ICM H01L021-3065
ICS C23F004-00

L115 ANSWER 7 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1995-204907 JAPIO
TITLE: CUTTING WORK **TOOL** AND ITS COATING METHOD
INVENTOR: HARADA HIROSHI
PATENT ASSIGNEE(S): UBE IND LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 07204907	A	19950808	Heisei	B23B027-14

APPLICATION INFORMATION
STN FORMAT: JP 1994-5273 19940121
ORIGINAL: JP06005273 Heisei
PRIORITY APPLN. INFO.: JP 1994-5273 19940121
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995
AN 1995-204907 JAPIO
AB PURPOSE: To obtain a long life cutting work **tool** which has a film that never peels off from the base metal bearing a severe using condition by coating the surface of the knife edge with a TiAlN layer and further forming a intermediate layer composed by a Ti layer between the TiAlN coated layer and the base metal.
CONSTITUTION: A Ti material on the outer circumference of a target 25 is filmed on the knife edge surface of a base metal by starting electric

discharge from a direction current power unit for discharging connected to the cathode **20** of a spattering device 100 and **controlling** the electric current running to a magnetic field exciting solenoid **coil** 21 so as to come near the outer circumferential side of **plasma**. The electric current running to the magnetic field exciting solenoid **coil** 21 is then changed and discharged by **controlling** it so that **plasma** can generate in the center of a target 25. Nitrogen **gas** is **introduced** into the spattering device 100 and TiAlN film is formed on the Ti film on the knife edge surface of the base metal until the thickness becomes about 2μm. Thus a desired cutter 24 can be obtained.
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IC ICM B23B027-14
ICS B23P015-28; C23C014-06; C23C014-34

L115 ANSWER 8 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1994-151383 JAPIO
TITLE: METHOD OF ETCHING HIGH-PERMITTIVITY MULTICOMPONENT OXIDE FILM AND REFRACTORY METAL FILM, MANUFACTURE OF THIN-FILM CAPACITOR, AND **PLASMA APPARATUS** FOR FILM FORMATION
INVENTOR: HANAZAKI MINORU; KUSUMI YOSHIHIRO; NANBA TAKANORI; FUJIWARA NOBUO; OKUDAIRA TOMOHITO; ITO HIROMI
PATENT ASSIGNEE(S): MITSUBISHI ELECTRIC CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 06151383	A	19940531	Heisei	H01L021-302

APPLICATION INFORMATION
STN FORMAT: JP 1992-302703 19921112
ORIGINAL: JP04302703 Heisei
PRIORITY APPLN. INFO.: JP 1992-302703 19921112
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994

AN 1994-151383 JAPIO
AB PURPOSE: To obtain an etching method in which a high-permittivity multicomponent oxide film and refractory metal or metal compound, having a high selectivity relative to a mask can be processed by etching the multicomponent oxide film using, as an etching gas, an organic gas which produces a volatile organic metal.
CONSTITUTION: Methane (CH<SB>4</SB>) that is a hydrocarbon **gas** is **supplied** to the inside of a processing chamber 5 at a rate of 500cc per minute at a gas pressure of 3mTorr. A high frequency of 13.56MHz is applied from a high frequency power source 10 at 1000W, and a magnetic field having 200G is generated by causing a current to flow through a **coil** 11, whereby the combination of the high frequency and the magnetic field induces a magnetron **discharge** to produce **plasma**. A PbLaZrTiO<SB>3</SB> film 3 of the multicomponent oxide film having a high dielectric constant is etched by the **plasma**. At this time, the temperature of **electrodes** is **controlled** to a constant temperature, and the temperature of a wafer is 150°C immediately after the completion of the etching.
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IC ICM H01L021-302
ICS H01L027-04; H01L027-108

L115 ANSWER 9 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1993-331638 JAPIO

TITLE: **PLASMA CONTROLLING** METHOD AND DEVICE IN SPUTTERING **APPARATUS**
INVENTOR: HARADA HIROSHI
PATENT ASSIGNEE(S): UBE IND LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 05331638	A	19931214	Heisei	C23C014-35

APPLICATION INFORMATION
STN FORMAT: JP 1992-178801 19920528
ORIGINAL: JP04178801 Heisei
PRIORITY APPLN. INFO.: JP 1992-178801 19920528
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993

AN 1993-331638 JAPIO

AB PURPOSE: To execute uniform etching to a target and to improve its utilizing efficiency by arranging solenoid **coils** at the inside of a cathode in a sputtering **apparatus** and periodically **controlling** energizing currents flown to the **coils**.
CONSTITUTION: At the time of arranging the substrate 11 to be treated opposite to a cathode 10 provided with solenoid **coils** 16 and 17, a central magnetic pole 14 and a peripheral pole 15 on the surface of a packing plate 19 of a target 18, **introducing** an inert **gas** such as Ar from a **gas introducing** pipe 12 thereto, turning on a high pressure power source 1 for **discharge** to generate **plasma** by glow **discharge**, ionizing the Ar gas, bombarding the target 18 with it and forming a thin film by a target material on the substrate 11 a primary **electrode** 2 and a secondary **electrode** 3 are changed by a polarity changing switch 4, electric currents flown to the solenoid **coils** 16 and 17 are periodically reversed, and the **plasma** is evenly moved on the whole face of the target 18. The surface of the target is uniformly etched, by which its using efficiency is improved, and its service life is prolonged.
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IC ICM C23C014-35
ICS C23C014-54

L115 ANSWER 10 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1993-275379 JAPIO
TITLE: **PLASMA** PROCESSING **APPARATUS**
INVENTOR: OKAMOTO KIYOKO
PATENT ASSIGNEE(S): SUMITOMO METAL IND LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 05275379	A	19931022	Heisei	H01L021-302

APPLICATION INFORMATION
STN FORMAT: JP 1992-71931 19920330
ORIGINAL: JP04071931 Heisei
PRIORITY APPLN. INFO.: JP 1992-71931 19920330
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993

AN 1993-275379 JAPIO

AB PURPOSE: To reduce the amount of reaction product precipitating in a variable orifice so as to eliminate the causes for increasing particles by

heating the variable orifice by a heating means at higher temperature than the specified temperature and passing the reaction product in a gaseous state through it for **exhausting**.
CONSTITUTION: While a reaction chamber and **exhaust** system are kept in a constant temperature by a heater, a wafer is placed on a sample table 6 inside an reaction chamber 1 and a necessary amount of **gas** is **supplied** through a **gas** feed pipe 8. Then it is **exhausted** by a turbo molecular pump 5 and a dry pump 9 and the pressure inside the chamber 1 is **controlled** by a variable orifice 4 so as to be constant. Thereafter the reaction chamber is applied with magnetic field by means of a magnetic field generating **coil** to generate **plasma** through electronic cycrotron resonance and simultaneously an **electrode** for the sample table is applied with high-frequency electric power to perform etching process by the **plasma**. In this step, the generation of particles can be suppressed by heating the variable orifice, an extented part of **exhaust** pipe and a reaction wall.

IC ICM H01L021-302
ICS C23F004-00; H05H001-46

L115 ANSWER 11 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1989-191779 JAPIO
TITLE: METHOD AND **APPARATUS** FOR THIN FILM SYNTHESIS BY HYBRID **PLASMA**
INVENTOR: FUJITA KANJI
PATENT ASSIGNEE(S): SAGA UNIV
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 01191779	A	19890801	Heisei	C23C016-50

APPLICATION INFORMATION
STN FORMAT: JP 1988-14529 19880127
ORIGINAL: JP63014529 Showa
PRIORITY APPLN. INFO.: JP 1988-14529 19880127
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1989
AN 1989-191779 JAPIO
AB PURPOSE: To form a thin high-quality film by means of hybrid **plasma** by biasing, by means of a D.C. electric power source, the hybrid **plasma** produced by the electric **discharge** of microwaves and high-frequency waves and regulating bias voltage and the electric power of the microwaves so as to **control** the energy and density of beam ions.
CONSTITUTION: A D.C. bias voltage is impressed on a cylindrical vacuum vessel 1 equipped with an electromagnetic **coil** 7 outside, and a reactant **gas** is **supplied** from the inlet side of the above vessel 1. On the other hand, a wire-mesh grid 8 is provided to the outlet side of the vessel 1 through which the reactant gas is allowed to flow, and also a substrate 11 is provided to the inside of a secondary vacuum vessel 2 located on the center line of the vessel 1, and further, two plate-like high-frequency **electrodes** 9 connected to a high-frequency electric power source 10 are disposed in a manner to be opposed to each other in front of the above substrate 11, and then, high-frequency electric **discharge** is carried out in the vessel 2. Subsequently, the above reactant gas is formed into a state of microwave **discharge plasma** by means of microwaves 12 introduced through a waveguide 4. The reactant gas in the above plasmic

state is accelerated by means of bias voltage impressed on the vessel 1, passed through the grid 8, fed into the vessel 2, and then, a high-frequency **discharge** energy is applied to the above **plasma** while it is passed between the high-frequency **electrodes** 9, by which the thin high-quality film can be formed on the substrate 11 at low temp.

IC ICM C23C016-50
ICS C23C016-34

L115 ANSWER 12 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1988-210752 JAPIO
TITLE: ICP EMISSION ANALYZER
INVENTOR: OKADA KOJI; OMORI YOSHIHISA
PATENT ASSIGNEE(S): SHIMADZU CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 63210752	A	19880901	Showa	G01N021-73

APPLICATION INFORMATION
STN FORMAT: JP 1987-44186 19870227
ORIGINAL: JP62044186 Showa
PRIORITY APPLN. INFO.: JP 1987-44186 19870227
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1988

AN 1988-210752 JAPIO

AB PURPOSE: To automate an analysis by a sequence **controller** by providing a means for detecting the formation of filamentary **plasma** and **controlling** on and off, etc., of a filamentary **plasma** inducing means by the detection signal thereof.
CONSTITUTION: This **instrument** is so constituted that the formation of the filamentary **plasma** (f) is detected by an impedance detector D which detects said formation by a change in the input impedance of a **coil** C wound on a **plasma** torch P. A **plasma** flame F by a torch P is then formed by the sequence **controller** 12 and after the impedance is matched, a sample is dropped into a sample receiver 4 and the sample is dried by a heater 5. A Tesla **coil** T is thereafter operated to generate corona **discharge** from the receiver 4. **Plasma** (f) extends from the flame F and arrives at the receiver 4 when the formed ions arrive at the flame F. The **plasma** evaporates the sample at the tip of an **electrode** 3 and **supplies** the **vapor** thereof to the flame F. The formation of the **plasma** (f) is detected by the detector D and the operation of the **coil** T is stopped. Spectrophotometric measurement by a measurement circuit 11 is then executed.

IC ICM G01N021-73

L115 ANSWER 13 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1988-176460 JAPIO
TITLE: **APPARATUS** FOR PRODUCING THIN FILM
INVENTOR: TANAKA HIROYOSHI; MUKAI YUJI
PATENT ASSIGNEE(S): MATSUSHITA ELECTRIC IND CO LTD
PATENT INFORMATION:

PATENT NO KIND DATE ERA MAIN IPC

JP 63176460	A	19880720	Showa	C23C014-32

APPLICATION INFORMATION
STN FORMAT: JP 1987-5366 19870113
ORIGINAL: JP62005366 Showa
PRIORITY APPLN. INFO.: JP 1987-5366 19870113
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1988
AN 1988-176460 JAPIO
AB PURPOSE: To permit formation of a good-quality thin film at a high speed on a substrate by providing means for **introducing gas** into a **plasma** chamber, bringing the gas into contact with a raw material by ionization, **controlling** the temp. of the raw material and drawing out the generated gas to a film forming chamber.
CONSTITUTION: The gas such as Ar is admitted at a specified temp. into the **plasma** chamber 7 and is converted to **plasma** by an RF **coil** 12, etc. The raw material 13 such as Al put into the lower part of the **plasma** chamber 7 is heated by a heater 14 and is **controlled** to a set temp. by a thermocouple 15 and a temp. **controller** 16. The material 13 is sputtered by Ar ions, etc., to release atoms of Al. The generated gas of the material 13 is drawn out of the **plasma** chamber 7 by a leading out electrode 18 and is bombarded onto the substrate **20** installed on a susceptor 19 so that the gas is combined with the gaseous O<SB>2</SB> introduced from the outside and the thin film of Al<SB>2</SB>O<SB>3</SB>, etc., is formed.
COPYRIGHT: (C)1988,JPO&Japio
IC ICM C23C014-32
ICS H01C017-08; H01L021-316; H01L021-86

L115 ANSWER 14 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1988-148635 JAPIO
TITLE: METHOD AND **EQUIPMENT** FOR MICROWAVE **PLASMA** TREATMENT IN MAGNETIC FIELD
INVENTOR: HAMAZAKI RYOJI; FUJII TAKASHI
PATENT ASSIGNEE(S): HITACHI LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 63148635	A	19880621	Showa	H01L021-302

APPLICATION INFORMATION
STN FORMAT: JP 1986-294839 19861212
ORIGINAL: JP61294839 Showa
PRIORITY APPLN. INFO.: JP 1986-294839 19861212
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1988
AN 1988-148635 JAPIO
AB PURPOSE: To widen practically applicable magnetic field conditions and expand process characteristics by a method wherein the magnetic field conditions which are effective for starting a discharge and the magnetic field conditions which are effective in the aspect of the process characteristics are independently **controlled** step by step.
CONSTITUTION: A sample **20** is placed and treating **gas** is **introduced** into a **discharge** tube 12 and a pressure in the discharge tube 12 is **controlled** to be a required value.
On the other hand, signals corresponding to conditions of a current applied from an electric source 16 to a field **coil** 15 which are determined by a magnetic field intensity which produces a discharge in the

discharge tube 12 easily and which are inputted to a **control** means 17 are inputted to the electric source 16 from the **control** means 17 and the conditions of the current applied from the electric source 16 to the field **coil** 15 are properly **controlled** to produce the discharge in the discharge tube 12 easily. After the discharge is produced as described above, the magnetic field intensity is **controlled** to the intensity corresponding to the treatment of the sample **20**. With this constitution, the practically applicable magnetic field conditions can be widened and the process characteristics can be expanded.

IC ICM H01L021-302
ICS H01L021-205; H01L021-31

L115 ANSWER 15 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1985-206029 JAPIO
TITLE: **PLASMA** SURFACE TREATMENT **APPARATUS**
INVENTOR: TSUKAGUCHI TSUTOMU
PATENT ASSIGNEE(S): ANELVA CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 60206029	A	19851017	Showa	H01L021-302

APPLICATION INFORMATION
STN FORMAT: JP 1984-61560 19840329
ORIGINAL: JP59061560 Showa
PRIORITY APPLN. INFO.: JP 1984-61560 19840329
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1985

AN 1985-206029 JAPIO

AB PURPOSE: To fantastically increase the etching rate for a sample provided opposed against the **electrode** by providing end plates at both ends of bar **electrode** forming an **apparatus**, biasing such end plates to negative with **electrode** and then reflecting electrons at the end plates and returning toward the center of **electrode** again.
CONSTITUTION: After a reaction vessel 110 is **exhausted** to a vacuum condition of 10<SP>-3</SP>∼10<SP>-5</SP>Torr, halogenide active gas such as CF<SB>4</SB>, BCl<SB>3</SB> is **supplied** through a **gas controller** 113 and the degree of vacuum is kept at 10<SP>-1</SP>∼10<SP>-3</SP>Torr. Next, a high frequency power is applied between the cathodes 101, 103, 104 and sample **electrode** 100 and reaction vessel 110 by the RF power supplies 109 and 190 to generate **plasma** in the periphery of bar type **electrode** 101. In this case, since potential gradient generated in the ion sheath orthogonally crosses the line of magnetic force generated by the **coils** 114 and 115, electrons are diffused toward end direction of **electrode** 101 while rotating in the periphery of **electrode** 101. Therefore, the end plates 103 and 104 are provided at both ends of **electrode** 101, these are biased negatively in the same potential as the **electrode** 101 and electrons are returned to the center of **electrode** 101 as indicated by 118.

IC ICM H01L021-302
ICS C23C014-22; C23F004-00

L115 ANSWER 16 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1985-206028 JAPIO

TITLE: **PLASMA CONTROL APPARATUS**
INVENTOR: WATANABE ETSURO; KAMIMURA TAKASHI; OTSUBO TORU
PATENT ASSIGNEE(S): HITACHI LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 60206028	A	19851017	Showa	H01L021-302

APPLICATION INFORMATION
STN FORMAT: JP 1984-60656 19840330
ORIGINAL: JP59060656 Showa
PRIORITY APPLN. INFO.: JP 1984-60656 19840330
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1985
AN 1985-206028 JAPIO
AB PURPOSE: To stabilize **plasma discharge** by always monitoring **plasma** impedence which changes from time to time during the etching and making constant the impedance by feeding such impedance back to the **gas supply** system.
CONSTITUTION: The etching **gas** 10 is **supplied** into a processing chamber 4 through a valve 11 up to a constant pressure, a high frequency power is applied to a lower **electrode** 2 in the processing chamber 4 through a matching circuit 6 from a high frequency power supply 5, and thereby **plasma** is generated against the upper **electrode** 3. The matching circuit 6 is so configurated as providing a potential between the **electrode** 2 and a **coil** 6a in the circuit 6, a potential between the **coil** 6a and a variable capacitor 6b and an inductance value of **coil** 6a. These potentials are sampled in every constant period by a data sampling circuit 15 and is then sent to a calculation **control** circuit 7 consisting of a phase detector 6a, a calculator 7a and a **controller** 7c. Here, an inductance is monitored, a command is given to a flow rate **controller** 12 in order to **control** flow rate of gas 10. Thereby, power consumed by **plasma** is set to a constant value.

IC ICM H01L021-302

L115 ANSWER 17 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1985-023943 JAPIO
TITLE: ION GENERATING **APPARATUS**
INVENTOR: KUSAKABE KAZUTOSHI
PATENT ASSIGNEE(S): JEOL LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 60023943	A	19850206	Showa	H01J037-08

APPLICATION INFORMATION
STN FORMAT: JP 1983-132128 19830720
ORIGINAL: JP58132128 Showa
PRIORITY APPLN. INFO.: JP 1983-132128 19830720
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1985
AN 1985-023943 JAPIO
AB PURPOSE: To sufficiently **control** an energy of ions in the **plasma** with a DC voltage of acceleration power supply and leads the sufficient amount of ions of adequate energy to the target by

inserting insulated transformer between a matching circuit and an **electrode**.
CONSTITUTION: An insulated transformer 11 where the primary side and the secondary side are insulated is inserted between an output end of a matching circuit 8 and a terminal of a high frequency **coil** 7. For example, a chamber 1 to be **exhausted** is **exhausted**, the Ar **gas** is **supplied** to said chamber, and the chamber 1 to be **exhausted** is filled with the **plasma** ambient by applying a high frequency voltage from a high frequency power supply 9. Where an evaporating material in a crucible 3 is vaporized by the electron beam impact under this condition, the vaporized particles are ionized and ion energy is activated by a DC voltage of acceleration power supply 10 and the ions are adhered to the target 2. Since a high frequency voltage to be applied to the high frequency **coil** 7 from the insulated transformer 11 is a floating voltage, a potential for the earth of **plasma** formed around the high frequency **coil** 7 is positive, the ion in the **plasma** is energized by a negative DC voltage applied to the target 2, and such ions are running to the target 2.

IC ICM H01J037-08
ICS C23C014-32; C23F001-00; H01J027-08; H01J037-30

L115 ANSWER 18 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1984-161812 JAPIO
TITLE: **PLASMA** CVD **EQUIPMENT**
INVENTOR: MURAMATSU SHINICHI
PATENT ASSIGNEE(S): HITACHI LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 59161812	A	19840912	Showa	H01L021-205

APPLICATION INFORMATION
STN FORMAT: JP 1983-35821 19830307
ORIGINAL: JP58035821 Showa
PRIORITY APPLN. INFO.: JP 1983-35821 19830307
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1984
AN 1984-161812 JAPIO
AB PURPOSE: To prevent a formed film from contamination and **control** the growing speed of the formed film by a method wherein a convergent magnetic field and an electric field concentration accelerating type or a magnetic field induction type **electrode** are jointly used to specify a **plasma** generating region.
CONSTITUTION: A **coil** 4 is provided to the outside of a vacuum vessel which has **discharge electrodes** 1 and substrates 2 are put on one of the **electrodes**. A metal electric field concentration type **electrode** 5, which has fine projections, is provided on another **electrode** 1. The substrates 2 are heated by a heater 6 buried in the **electrode** and, after vacuum **exhaustion**, hydrogen gas, which contains monosilane and diborane is introduced and a convergent magnetic field is generated near the substrates 2 and the **electrode** 5 by applying a D-C current to the **coil** 4. A high frequency voltage 3 is applied to the **electrodes** 1 to generate a **plasma** between the substrates 2 and the **electrode** 5 to form a P type amorphous silicon layer. Then an I-type layer is formed by introducing monosilane only and finally an N type layer is formed by **introducing** hydrogen **gas**

which contains monosilane and phosphine. With this constitution, the **discharge** region is limited and the deterioration of the characteristics is avoided and the growing speed of the film can be **controlled**.

IC ICM H01L021-205
ICS H01L031-04
ICA H01L021-31

L115 ANSWER 19 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1981-146069 JAPIO
TITLE: IGNITION **APPARATUS** FOR INTERNAL COMBUSTION ENGINE
INVENTOR: HAMAI KYUGO; NAKAGAWA YASUHIKO; NAKAI AKIJI; MARUYAMA RYUSABURO
PATENT ASSIGNEE(S): NISSAN MOTOR CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 56146069	A	19811113	Showa	F02P015-00

APPLICATION INFORMATION
STN FORMAT: JP 1980-48841 19800414
ORIGINAL: JP55048841 Showa
PRIORITY APPLN. INFO.: JP 1980-48841 19800414
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1981

AN 1981-146069 JAPIO

AB PURPOSE: To enable accurate ignition and subsequent acceleration of combustion to be made simultaneously by a method wherein a flame core is first formed by a spark ignition and then a **plasma gas jet** is applied on the surface of the flame while the flame grows larger.
CONSTITUTION: A high voltage is generated from an ignition **coil** 4 through an ignition advance angle **control** circuit 5 and is distributed to ignition plugs 10 through a distributor 8 so that the ignition plug 10 is spark-ignited to fire a gas mixture. After a lapse of a delay time due to a delay circuit 22, a high voltage is generated through the operation of an ignition **coil 20** and at the same time a switching element 24 of a **plasma** discharge circuit 2' is turned ON to thereby place the charge of a capacitor 14 in a **dischargeable** condition. Accordingly, the **injection** of the **plasma** jet is made at the ingnition plug 10 with a delay of several msec from the initial ignition.

IC ICM F02P015-00

L115 ANSWER 20 OF 20 JAPIO COPYRIGHT 2002 JPO
ACCESSION NUMBER: 1980-023085 JAPIO
TITLE: PRODUCTION OF SILICON FILM
INVENTOR: ABE HARUHIKO
PATENT ASSIGNEE(S): MITSUBISHI ELECTRIC CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 55023085	A	19800219	Showa	C01B033-02

APPLICATION INFORMATION

STN FORMAT: JP 1979-53903 19790427
ORIGINAL: JP54053903 Showa
PRIORITY APPLN. INFO.: JP 1979-53903 19790427
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1980
AN 1980-023085 JAPIO
AB PURPOSE: To obtain a high quality silicon (cpd.) deposited film with gas **plasma** by **controlling** an electric current for static magnetic field producing **coils** set outside a reaction tube to prevent mixing of pollutants from **electrodes** and to maintain **discharge** stable.
CONSTITUTION: Silicon substrates 12 are mounted on heating graphite plate 13, **gas introduction** part 1 is attached, and cock **20** is opened to **exhaust** air in the **apparatus** with vacuum pump 22. Next cock 5 is opened to **introduce** silane **gas** or mixed gas of silane gas and NH<SB>3</SB> or CO<SB>2</SB>, and the gas is spouted into vacuum vessel 10 through spouting holes 9 of cover 8. By applying power to **plasma** generating high frequency **electrodes** 11 **plasma** is generated in container 10. At this time, in order to **control** the depositing speed and quality of silicon (cpd.) films to be formed on the surfaces of substrates 12, an electric current is supplied to heater 15 buried in plate 13 to adjust the temp. of substrates, and **plasma** generating high frequency power is regulated.
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IC ICM C01B033-02
ICS C01B021-064
ICA H01L021-203

=> d L136 1-28 max

L136 ANSWER 1 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2002-487945 [52] WPIX
DNN N2002-385567 DNC C2002-138570
TI **Control** of **plasma** to prevent negatively-charged ions and particulates from becoming trapped within the **plasma**, involves using **plasma**-formation **apparatus** with **plasma** chamber having unique **electrode** and **electrode**-biasing configuration.
DC L03 U11 W06 X14 X22 X25
IN OHKAWA, T; TSUNODA, S I
PA (GEAT) GEN ATOMICS
CYC 1
PI US 6375860 B1 20020423 (200252)* 15p C23F001-00
ADT US 6375860 B1 US 1995-401869 19950310
PRAI US 1995-401869 19950310
IC ICM C23F001-00
ICS C23C014-00; C23C016-00; H05H001-24
AB US 6375860 B UPAB: 20020815
NOVELTY - **Plasma** is **controlled** to prevent negative ions and negatively-charged particulates from becoming trapped within the **plasma** by using a **plasma**-formation **apparatus** that utilizes a **plasma** chamber having a unique **electrode** and **electrode**-biasing configuration that **controls** the **plasma** potential.
DETAILED DESCRIPTION - **Controlling** a **plasma** to prevent negative ions and negatively-charged particulates from becoming trapped within the **plasma** involves forming a **plasma** from a specified gas within a **plasma** formation chamber having

control electrodes at each end of the chamber that are aligned with a longitudinal axis of the chamber, and reference **electrodes** along opposing sides of the chamber that are aligned with a lateral axis of the chamber, and each having a surface on which a workpiece may be supported and with which it is in electrical contact; biasing the **control electrodes** with a first bias voltage that includes a negative direct current component to **control** the **plasma** potential so that the **plasma** potential is positive with respect to the **control electrodes**; restricting electron flow in the **plasma** to a longitudinal flow that parallels the longitudinal axis, while at the same time allowing a lateral negative ion flow or a lateral negative particulate flow in the **plasma,** by applying a magnetic field of a specified magnitude to the **plasma** formation chamber that has magnetic field lines that parallel the longitudinal axis to restrict movement of electrons to a direction that parallels the magnetic field lines while at the same time allowing negative ions and negatively-charged particulates to laterally cross the magnetic field lines; and biasing the reference **electrodes** with a second bias voltage that is more positive than the **plasma,** so that the **plasma** potential becomes negative relative to the reference **electrodes.** Negative ions and negatively-charged particulates in the **plasma** are laterally drawn out of the **plasma** across the magnetic field lines to the more positively charged reference **electrodes** and are not allowed to become trapped within the **plasma.**

An INDEPENDENT CLAIM is included for a **plasma** formation **apparatus** comprising a **plasma** formation chamber (30) having longitudinal and lateral axes extending from one end to the other; a source of **gas;** a mechanism for **introducing** the **gas** into the **plasma** formation chamber; mechanism for initiating and sustaining a **plasma discharge** within the **plasma** formation chamber; a pair of Helmholtz **coils** (44a-b, 46a-b) for creating a b-field within the **plasma** formation chamber; opposing **control electrodes** (36a-b) through which the longitudinal axis passes; a mechanism for applying a first direct current (dc) electrical potential between the **control electrodes** to **control** the dc potential of the **plasma;** opposing reference **electrodes** (38a-b) through which the lateral axis passes; and mechanism for applying a second dc electrical potential to the opposing reference **electrodes,** which is positive with respect to the **plasma** and any negatively-charged ions or particulates in the **plasma.** The magnitude of the B-field prevents movement of electrons in the **plasma** across the B-field lines to the reference **electrodes,** yet allows negatively-charged ions or particulates in the **plasma** to move laterally across the B-field lines to the reference **electrodes.** Electron flow in the **plasma** is restricted to longitudinal flow, which prevents electrons from being attracted to the reference **electrodes** and altering the **plasma** potential. Negatively-charged ions and particulates are removed from the **plasma** by being attracted to the more positive potential of the reference **electrodes.** They are not trapped in the **plasma,** and are thus not available to serve as nucleation points or agglomeration points for the formation of contaminants within the **plasma.**

USE - The method is used for **controlling** a **plasma** to prevent negative ions and negatively-charged particulates from becoming trapped within the **plasma. Plasma** processing has been used for e.g., the electronics industry (e.g. very large-scale integrated microelectronic circuits or chips), aerospace, automotive, steel,

biomedical, flat-panel displays, solar cells, and toxic waste management industries.

ADVANTAGE - The invention allows careful **control** of the magnetic field strength, making it weak to allow negatively- and positively-charged ions or negatively-charged particulates in the **plasma** to escape across the magnetic field lines to the second set of **electrodes**, yet strong to prevent electrons from escaping to the second set of **electrodes**. It minimizes the formation of internally-formed contaminants within the **plasma**. It produces clean **plasma**, which allows processing steps to be carried out at a more rapid rate than has previously been possible.

DESCRIPTION OF DRAWING(S) - The figure is a schematic diagram of a **plasma** processing **apparatus**.

Plasma formation chamber 30
Control electrodes 36a-b
Reference **electrodes** 38a-b
Pair of Helmholtz **coils** 44a-b, 46a-b

Dwg.3/4

TECH US 6375860 B1 UPTX: 20020815

TECHNOLOGY FOCUS - ELECTRONICS - Preferred **Apparatus**: Each **coil** of the pair of Helmholtz **coils** is approximately concentric with the longitudinal axis, has a radius greater than the width or height of the **plasma** formation chamber, and is longitudinally spaced from the other **coil** by a distance approximately equal to the radius of each **coil**. The magnetic field applied has a strength of 10-500 gauss at the longitudinal axis. Each **control electrode** comprises a segmented **electrode** having electrically insulated segments. One of the opposing reference **electrodes** serves as a platform upon which a workpiece to be exposed to the **plasma** is placed. The **apparatus** further comprises a mechanism for maintaining the neutral gas flow rate to 2-60 sccm.

Preferred Method: The step of biasing at least one reference **electrode** with a second bias voltage that is more positive than the **plasma** comprises grounding at least one reference **electrode**. The step of biasing the **control electrodes** comprises biasing each segment of the **control electrodes** with a different bias voltage and biasing it further with a negative dc component that is different from the negative dc components with which other segments of the same **electrode** are biased, but biasing corresponding segments of both **electrodes** with the same negative dc component. Each **control electrode** is biased by powering the **electrode** with an alternating current (ac) signal having a frequency of 5-50 MHz. The ac signal functions to power a **plasma discharge** within the **plasma** formation chamber. The method further includes introducing microwave, radio frequency, or laser energy into the **plasma** formation chamber to power a **plasma discharge** in it.

FS CPI EPI
FA AB; GI
MC CPI: L04-C07D; L04-C18; L04-D04
EPI: U11-C09C; W06-B01C9; X14-F; X22-X; X25-A04; X25-Q01; X25-W01

L136 ANSWER 2 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2001-658907 [76] WPIX
DNN N2001-491176 DNC C2001-194223
TI Decomposition device using high frequency **plasma** for organic halogen compounds e.g. freon, comprises adjustment unit to adjust process target material and/or **discharge** adjuvants **introduced**

into **discharge** tube.
DC J04 P35 X14 X25
PA (TOKE) TOSHIBA KK
CYC 1
PI JP 2001232180 A 20010828 (200176)* 12p B01J019-08
ADT JP 2001232180 A JP 2000-50199 20000225
PRAI JP 2000-50199 20000225
IC ICM B01J019-08
ICS A62D003-00; H05H001-46
AB JP2001232180 A UPAB: 20011227
NOVELTY - A decomposition device (1) comprises a **discharge** tube (2) wound with a high frequency **coil** (5) at the periphery, and an adjustment unit (100) to adjust process target material and/or **discharge** adjuvants **introduced** into the **discharge** tube. A **plasma** is generated in **discharge** tube by passing exciting current to high frequency **coil**, and process target material is decomposed using generated **plasma**.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following: (i) Decomposition of compound using high frequency **plasma**; (ii) A compound decomposition system, which comprises a monitor unit to monitor **exhaust** gas generated by **plasma** processing, component of waste water, temperature or pH, and a feedback **control** unit to form a **control** signal based on the result of monitor, and to supply to a various **control** units.
USE - For decomposing organic halogen compounds such as freon using high frequency **plasma**.
ADVANTAGE - The **plasma** can be maintained stably with low electric power. Decomposition of various process target material is not based on pressure condition of the decomposition device.
DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of compound decomposition device using high frequency **plasma**.
(Drawing includes non-English language text).
Compound decomposition device 1
Discharge tube 2
High frequency **coil** 5
Adjustment unit 100
Dwg.1/15
TECH JP 2001232180 AUPTX: 20011227
TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred **Apparatus**: The compound decomposition device further comprises a cleaning unit to flush the deposit formed on the surface of inner wall using a cleaning liquid injected along the inner wall of **discharge** tube, a heater to heat the process target material using **exhaust** heat of **plasma exhaust** gas, a temperature **control** unit to **control** temperature of water vapor flowing channel provided between inner and outer walls of **discharge** tube, a detachable **cooling** portion provided to post stage of **discharge** tube, and a cleaning unit to clean the **cooling** portion. The compound decomposition system comprises a collection unit to collect products such as carbon, carbon monoxide, hydrogen, and acid accumulated in a neutralization tank provided to downstream side of **discharge** tube.
FS CPI EPI GMPI
FA AB; GI
MC CPI: J04-X
EPI: X14-F; X25-W01

L136 ANSWER 3 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2001-310674 [33] WPIX

DNN N2001-222491 DNC C2001-096377
TI **Plasma** processing **apparatus** for ashing or etching ion **exchange** resin, has high frequency induction **coil** arranged on window **surface**, such that **surface** area occupied by **coil** satisfies preset relationship.
DC K07 V02 V05 X14
PA (FJIE) FUJI ELECTRIC CO LTD
CYC 1
PI JP 2001059894 A 20010306 (200133)* 10p G21F009-30
ADT JP 2001059894 A JP 1999-236428 19990824
PRAI JP 1999-236428 19990824
IC ICM G21F009-30
ICS H05H001-46
AB JP2001059894 A UPAB: 20010615
NOVELTY - An HF induction **coil** (15a) is arranged relative to a window surface (40) and an electric insulating material is coated inside a reaction container (2). The total surface area (A) occupied by the **coil** on the window satisfies the relationship A greater than 4 x 100 x S xd/f x epsilon S, where S is the surface area occupied by the insulating material (m2), d is the material thickness (m), epsilon S is the dielectric constant and f is the frequency of supplied current.

DETAILED DESCRIPTION - A **plasma** processing **apparatus** comprises a reaction container, an ion **exchange** resin and a window. The reaction container is coated with an electric insulation material on inner surface. A high frequency (HF) induction **coil** having a flat cross-section is formed on the atmospheric side surface of the window as a thin film or alternately on the inner side of the window. A **gas** inlet (5) **supplies** reactant **gas** or an other gas containing reactant gas to the reaction container, and a high frequency electric power supply unit (1) supplies a high frequency current to the induction **coil**. By supplying high frequency current to the induction **coil**, a high frequency magnetic field is induced inside the reaction container and due to the effect of the magnetic field, a **plasma** (6) is generated inside the reaction container. By plasmifying the reactant gas, the activity atoms or ions are produced and act on the ion **exchange** resin for ashing or etching.

USE - For ashing, etching, or thin film formation of ion **exchange** resin using **plasma**.

ADVANTAGE - Induction **coil** electric current characteristics and hysteresis phenomenon are eliminated and precise **control** of input **plasma** for treating ion **exchange** resin is achieved. The generation of tar in resin treatment is avoided and maintenance cost is reduced with improved operation rate.

DESCRIPTION OF DRAWING(S) - The figure shows a sectional drawing showing the basic composition of the **plasma** processing **apparatus**.

Electric power supply unit 1
Reaction container 2
Gas inlet 5
Plasma 6
Induction **coil** 15A
Window 40
Dwg.1/14
FS CPI EPI
FA AB; GI
MC CPI: K07-A03
EPI: V02-F01; V02-F03B; V05-F04L; V05-F05C1E; V05-F08E; V05-F08E1; X14-F

L136 ANSWER 4 OF 28 WPIX (C) 2002 THOMSON DERWENT

AN 2001-190633 [19] WPIX
CR 1999-046087 [04]; 2000-303272 [24]; 2001-441013 [09]
DNN N2001-135449 DNC C2001-056944
TI **Plasma** reactor for generating a processing **plasma** has
walls defining a processing chamber for holding a workpiece, and small
coil antennas arranged in discrete configuration within the
chamber.
DC M13 V02 V05 W02 X14
IN D'AMBRA, A; MOK, Y E; REMMINGTON, R E; SAMMONS, J E; YE, Y; REMINGTON, R E
PA (MATE-N) APPLIED MATERIALS INC
CYC 2
PI US 6158384 A 20001212 (200119)* 32p C23C016-00
WO 2000079568 A2 20001228 (200119) EN H01J037-32
W: JP
ADT US 6158384 A CIP of US 1997-869798 19970605, CIP of US 1998-158563
19980922, US 1999-336642 19990618; WO 2000079568 A2 WO 2000-US16921
20000619
FDT US 6158384 A CIP of US 6071372
PRAI US 1999-336642 19990618; US 1997-869798 19970605; US 1998-158563
19980922
IC ICM C23C016-00; H01J037-32
ICS H05H001-00
AB US 6158384 A UPAB: 20010822

NOVELTY - A **plasma** reactor comprises walls (210) defining a processing chamber (200) for holding a workpiece, and small **coil** antennas (100b) secured and arranged within the chamber in a spatially discrete configuration. The antennas generate **plasma** within the chamber to process the workpiece.

USE - The reactor is used for generating a processing **plasma**

.

ADVANTAGE - The reactor has greater thermal conductivity, and provides quicker transfer of heat from the antenna and the interior of the chamber to **coolant** fluid flowing through **cooling** channels formed in the chamber walls, making it easier to maintain a narrow chamber temperature range and avoid the problems of a conventional reactor in connection with the cracking and flaking off of deposits from the chamber walls. The reactor can be operated using any desired mix of inductively and capacitively coupler RF power, providing an opportunity to use the reactor to perform a variety of operations over a wide process window.

DESCRIPTION OF DRAWING(S) - The figure shows a side view of the small internal inductive **coil** type antenna within a wall of a **plasma** reactor.

Small **coil** antennas 100b
Pole regions 110b', 110b''
Processing chamber 200
Walls 210
Dwg.1B/15

TECH US 6158384 A UPTX: 20010405

TECHNOLOGY FOCUS - **INSTRUMENTATION** AND TESTING - Preferred Device: Each antenna comprises a separate electrically insulative jacket surrounding an electrical conductor. The jacket has a surface segmented by gaps(s) to inhibit eddy current flow in electrically conductive material deposits from electrically joining the segments, and comprises a thermally conductive non-sputtering material. The segmented surface of the antenna is adjacent pole region(s) (110b', 110b'') of the antenna. Each jacket has a surface exposed to the chamber and some comprise gaps in the exposed regions.

The antennas are within the chamber top wall, along and radially in the center of the top wall, in the side wall, or in the bottom wall so that

heat generated by the antennas is transferred to a chamber wall by conduction. The antennas are disposed in a dome shape, in a circular configuration, or comprise solenoidal-like **coils** along an axis parallel or extending from the adjacent wall of the chamber. The reactor also has **gas ports** surrounded with **nozzles**
having single **coil** antennas to deliver process gas to the chamber, and RF power source(s) coupled to the antennas allowing independent **control** of power to each antenna.
Process gas sources are coupled to the **nozzles** allowing different process **gas** types to be **supplied** to selected nozzles. Each antenna has two pole regions, and are in the chamber so that both the pole regions couple power to the **plasma**. Two gas **ports** are respectively coupled to process gas sources with process gas with a high and a low ionization energy, and are respectively disposed in chamber walls adjacent a high and low power region of the chamber. A shield is removably located within the jacket of some antennas to **control** power deposition in the chamber.

TECHNOLOGY FOCUS - CERAMICS AND GLASS - Preferred Material: The jacket comprises ceramic. The jacket comprises aluminum nitride.
FS CPI EPI
FA AB; GI
MC CPI: M13-E05
EPI: V02-F03B; V05-F04L; V05-F05C1; V05-F05E3; W02-B01A; W02-B09; X14-F02

L136 ANSWER 5 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2001-090050 [10] WPIX
DNN N2001-068171 DNC C2001-026266
TI Increasing efficiency of inductively coupled **plasma** for generation of synthetic gas involves designing torch to optimize flow rate of **gaseous** fluid and power **supply** for energizing induction **coil**.
DC E36 H04 M23 P55 X24
IN BLUTKE, A S; BOHN, E M; OTTINGER, R S; TUSZEWSKI, M G; VAVRUSKA, J S
PA (BLUT-I) BLUTKE A S; (BOHN-I) BOHN E M; (OTTI-I) OTTINGER R S; (TUSZ-I) TUSZEWSKI M G; (VAVR-I) VAVRUSKA J S
CYC 1
PI US 6153852 A 20001128 (200110)* 20p B23K010-00
ADT US 6153852 A US 1999-249657 19990212
PRAI US 1999-249657 19990212
IC ICM B23K010-00
AB US 6153852 A UPAB: 20010220
NOVELTY - Inductively coupled **plasma** (ICP) torch is designed to optimize the flow rate of **gaseous** fluid and power **supply** (30) for energizing an induction **coil** of ICP torch (22) to generate **plasma. Plasma** generation is carried out by passing gaseous fluid rich in carbon dioxide (CO_2) (16) into ICP torch.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS also included for:
(a) a method of maximizing the product yield in a reaction vessel (10), where:
(i) specific gaseous fluid is selected and passed to ICP torch and the ICP torch is operated with optimal flow rate of gaseous fluid, and
(ii) optimal power is supplied to the induction **coil** and the efficiency of the ICP is increased;
(b) a method of using CO_2 as chemical reactant and producing thermal **plasma** to convert feed stock material (12a) into a tailored gas composition, where:
(i) **plasma** generated from a **plasma** generator with variable CO_2 supply system and power supply is injected to reaction vessel through the inlet,

(ii) the product formed in the vessel is removed through an outlet of the vessel,
(iii) the CO_2 supplied to the generator is ionized to form thermal **plasma** which is injected to the reaction vessel to simultaneously supply heat and reactant, and
(iv) the feed material is injected to the vessel to react with ionized CO_2 and product is formed;
(c) an **apparatus** for converting feed material into tailored gas composition, comprising:
(i) a **plasma** generator having an inlet, outlet **port** and heat sink to maintain internal surface temperature of **plasma** temperature, and connected to a variable power supply,
(ii) a **gas supply** unit **supplying** CO_2 to produce ionized carbon dioxide,
(iii) a reaction vessel connected to the outlet of generator to receive the **plasma**, having reactor injection **port**(s) through which feed material is injected into the **plasma**, and
(iv) an outlet of the reactor conveying high temperature product formed by reacting feed material and CO_2 **plasma** by using the thermal energy of the **plasma**.
USE - For production of synthetic gas.
ADVANTAGE - The synthetic gas is produced effectively without the necessity of removing diluents such as water vapor, CO_2 or contaminants such as NOx and soot. The synthetic gas with varying hydrogen and carbon monoxide ratio is produced effectively without use of advanced technique.
DESCRIPTION OF DRAWING(S) - The figure shows the process flow diagram of **control** parameters to optimize ICP torch.
Reaction vessel 10
Feed stock material 12a
Carbon dioxide 16
ICP torch 22
Power supply 30
Dwg.5/9

TECH US 6153852 A UPTX: 20010220
TECHNOLOGY FOCUS - CHEMICAL ENGINEERING - Preferred Function: The method of increasing operating efficiency of ICP involves monitoring a parameter to produce a signal indicative of operating efficiency. From the signal obtained the power supply and the flow rate are adjusted to maximize the efficiency of ICP. The variable feed stock supply is coupled with a **controller** to selectively **control** the CO_2 gas.
The **controller** includes the processor which automatically varies the **plasma** gas flow rate and power supply as function of the signal.
An acid remover connected to outlet **port** of the reactor removes acid contaminant from the tailored gas composition.
A heat **exchanger** uses the heat from the tailored gas composition to preheat a portion of CO_2 and feed stock material.
Preferred Feed: The gaseous fluid comprises pure CO_2 or a mixture rich in carbon dioxide.
The feed stock material comprises organic material such as methane, carbon and hydrogen.
The feed stock is in solid, liquid or in gaseous form.
Preferred Design: The ICP is designed based on fixed parameters such as length, radius and frequency of power supply applied to operated ICP torch.
The injection **port** of the reactor is configured to produce tangential, radial, countercurrent **injection** pattern.
Preferred Method: **Additional** processing **gas** is added to the reaction vessel in which **plasma** is injected in order to ionize all the feed stock material.

The temperature of the product and yield output are monitored to produce signals indicative of the yield.
The yield of thermal chemical conversion process is optimized by adjusting either the power supply or flow rate of feed stock material.
Stream is injected to the reaction vessel to vary proportion of hydrogen to carbon monoxide in the synthetic gas.
The feed stock material is added to CO2 prior to ionization of carbon dioxide.
Preferred Product: The product is synthesis gas.

KW [1] 783-0-0-0 CL PRD; 97153-0-0-0 CL PRD; 255-0-0-0 CL
FS CPI EPI GMPI
FA AB; GI; DCN
MC CPI: E31-A01; H04-E04; M23-D01B
EPI: X24-D05
DRN 1066-S; 1066-U; 1423-P; 1423-U; 1532-P; 1532-U
CMC UPB 20010220
M3 *01* C106 C108 C550 C730 C800 C801 C802 C803 C805 C807 M411 M424 M720 M740 M904 M905 M910 N104
DCN: R01423-K; R01423-P
M3 *02* C101 C550 C810 M411 M424 M720 M740 M904 M905 N104
DCN: R01532-K; R01532-P
M3 *03* C106 C108 C530 C730 C800 C801 C802 C803 C805 C807 M411 M730 M904 M905 M910
DCN: R01066-K; R01066-S

L136 ANSWER 6 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2001-083507 [10] WPIX
DNN N2001-063810 DNC C2001-024434
TI Thin crystal semiconductor film formation for semiconductor devices, involves generating **plasma** in **plasma** chamber, impressing power on target, colliding **plasma** ion on target and sputtering ion from target on cleaned substrate.
DC L03 U11 V05 X14
PA (KAGA-N) KAGAKU GIJUTSU SHINKO JIGYODAN
CYC 1
PI JP 2000203990 A 20000725 (200110)* 9p C30B023-08
ADT JP 2000203990 A JP 1999-10450 19990119
PRAI JP 1999-10450 19990119
IC ICM C30B023-08
ICS C30B029-06; C30B030-04
AB JP2000203990 A UPAB: 20010220
NOVELTY - Microwave is introduced into **plasma** chamber (PC) to form **plasma** under electron cyclotron resonance conditions. High frequency bias is impressed on target (configured along downstream side of PC) having film forming material. **Plasma** ion is released from PC, collided on target and sputtered from target to form thin crystal film on cleaned substrate.
DETAILED DESCRIPTION - Thin crystal film formation by **plasma** sputtering involves **introducing** an inert **gas** at pressure of 10-4 to 10-3 Torr into a film forming chamber maintained at pressure of 5 multiply 10-7 Torr or less. Microwave (MW) is introduced into film forming chamber adjoined with **plasma** chamber (PC). **Plasma** is formed in PC by electron cyclotron resonance condition under magnetic field generated by a MW magnetic **coil**. **Substrate** (B) is heated at 400 deg. C and cleaned. High frequency bias (RF) or direct flow bias is impressed on target (Ta) (arranged along downstream side of PC) containing thin film forming material. **Plasma** ion is released from PC and collided on the target. Epitaxial thin crystal film is formed on substrate configured in **plasma** ion deposition chamber by sputtering **plasma** ion

from the target.
USE - For forming gallium arsenide (Ga As) film, silicon germanium (SiGe) film and diamond crystal thin films used in semiconductor devices.
ADVANTAGE - Degree of vacuum attainment is comparatively **low** and substrate **temperature** is maintained **low**. High functional epitaxial thin film with less impurities is formed.
DESCRIPTION OF DRAWING(S) - The figure shows the electron cyclotron resonance sputtering **apparatus**.
Microwave MW
Plasma chamber PC
Target Ta
Substrate B
High frequency bias RF
Dwg.1/10
TECH JP 2000203990 AUPTX: 20010220
TECHNOLOGY FOCUS - ELECTRONICS - Preferred Process: Ion energy on the surface of substrate is **controlled**. High frequency bias in the range of 200-500W is impressed on the target. The shutter is closed for 2-3 seconds after cleaning the surface of substrate and radio frequency (RF) power is raised to 200W, shutter is opened, RF power is set to predetermined value and an epitaxial crystal thin film is formed.
FS CPI EPI
FA AB; GI
MC CPI: L04-A; L04-A02A; L04-C01A
EPI: U11-C01A3; U11-C01J2; V05-F05C3; V05-F08D1; X14-F02

L136 ANSWER 7 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2000-596423 [57] WPIX
DNC C2000-178442
TI Volume reduction **apparatus** for ion **exchange** resin, includes a electromagnetic induction heater arranged in upper portion of moving stage which is loaded with dish containing ion **exchange** resin.
DC A91 K07
PA (FJIE) FUJI ELECTRIC CO LTD
CYC 1
PI JP 2000206295 A 20000728 (200057)* 6p G21F009-30
ADT JP 2000206295 A JP 1999-9993 19990119
PRAI JP 1999-9993 19990119
IC ICM G21F009-30
AB JP2000206295 A UPAB: 20001109
NOVELTY - An electromagnetic induction heater (31) is arranged in the upper portion of moving stage (22A) which is loaded with stainless steel made dish (4A) containing ion **exchange** resin to heat dish. Inner surface of dish is covered with air oxide having high far-infrared radiation coefficient.
DETAILED DESCRIPTION - A pressure reduction unit reduces the pressure inside the dish and reaction container (1) of volume reduction **apparatus**. Oxygen containing **gas** is **introduced** into the reaction container through the inlet (5) and **discharge** is generated by an electromagnetic field formed by a high frequency induction **coil** (11) so that active oxygen is produced to carry out volume reduction. Alternatively, a stirring unit is provided in reaction container to stir the ion **exchange** resin in dish. Baffle structures are provided in the outlet path (6) connected with pressure reduction unit.
USE - For reducing ion **exchange** resin produced as a waste material.
ADVANTAGE - As electromagnetic induction heater heats the dish, ion **exchange** resin heated with sufficient **control** and the

surface of resin is not exposed to **plasma** and so dehydration effect is accelerated. Consumption of electron by water component in resin is completed within a short time and so formation efficiency of active oxygen is increased, therefore volume reduction of resin is carried out very quicker. As stirring of ion **exchange** resin is carried out, temperature of resin is increased to accelerate dehydrate effect for increasing velocity of volume reduction. As inner surface of disk is covered with oxide having high infrared coefficient resin is heated by radiation and so temperature rise is quicker. As baffles are attached in outlet path, dispersing of low boiling point substance in waste gas is prevented and so contaminations are relieved, thereby maintenance is easy and volume reduction is performed efficiently.

DESCRIPTION OF DRAWING(S) - The figure shows the cross-sectional view of volume reduction **apparatus**.

Reaction container 1
Ion **exchange** resin 3
Disk 4A
Inlet 5
Outlet path 6
Moving stage 22A
Electromagnetic induction heater 31
Dwg.1/5

FS CPI
FA AB; GI
MC CPI: A12-M; K07-B
PLE UPA 20001219
[1.1] 018; P0000
[1.2] 018; ND05; J9999 J2915-R; N9999 N7283; K9950; N9999 N5867; K9416; Q9999 Q7772

L136 ANSWER 8 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2000-305572 [27] WPIX
DNN N2000-228460 DNC C2000-092923
TI **Plasma** treatment of rod- or fiber material is effected in **plasma** nozzle with **controlled plasma swirl** and gas flow, moderate degree of thermal treatment.
DC A35 A85 F06 X12 X14
IN BUSKE, C; FOERNSEL, P
PA (BUSK-I) BUSKE C; (FOER-I) FOERNSEL P; (COTT-N) COTTIN DEV INC
CYC 26
PI EP 994637 A2 20000419 (200027)* DE 7p H05H001-42
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
DE 19847774 A1 20000504 (200029) H05H001-34
US 6355312 B1 20020312 (200221) H05H001-34
DE 19847774 C2 20021017 (200270) H05H001-34
ADT EP 994637 A2 EP 1999-118618 19990921; DE 19847774 A1 DE 1998-19847774 19981016; US 6355312 B1 US 1999-418561 19991015; DE 19847774 C2 DE 1998-19847774 19981016
PRAI DE 1998-19847774 19981016
IC ICM H05H001-34; H05H001-42
ICS B01J019-08; B05D001-00; B05D003-06; B05D003-08; B29C059-14; C23C014-22; C23C016-44; H01J037-32; H05H001-48
AB EP 994637 A UPAB: 20000606
NOVELTY - In the **plasma** treatment of rod or fiber material the material (12) runs coaxially through a **plasma** nozzle (10).

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for **equipment** executing the process. The nozzle tube forms the outer electrode, working with an internal electrode (28) having a coaxial channel passing the material.

Preferred features: A coating **gas** is **supplied** into the nozzle, or into the **plasma** (14) produced by it. The working **gas** in the **plasma nozzle** is **swirled**. At the outer circumference of the **swirling** flow of the working gas, a secondary **gas** is **supplied** into the **plasma** nozzle (10). An arc (38) producing the **plasma** is so channeled by the **swirling** working gas, that it winds itself helicoidally around the material (12) passing through. The material is introduced into the **plasma** nozzle through a guide tube (32). Inside the guide tube, pressure is reduced. It is electrically-insulating. A **swirler** (24) induces the **swirling** flow.

USE - To treat a thread, wire or rod continuously, using a **plasma**. The objective is frequently to assist coating of plastics, by enhancing surface wetting. Wetting is demanded when printing, painting, or applying adhesives. Products include plastic fibers, yarns, threads, insulated wires, cables with plastic sheaths and glass fibers.

ADVANTAGE - The **equipment** carries out both polymerization of the surface molecules and **plasma** coating. The coating material is in the gaseous state. **Swirling** the **plasma** brings it into close contact with the fibers. Thermal intensity of treatment can be **controlled** by altering the degree of **swirl** and/or by changing the **supply** of **secondary gas**. **Reduction** in **pressure** in the electrode channel, prevents unwanted air entrainment with a fast-moving thread.

DESCRIPTION OF DRAWING(S) - A vertical, axial cross section is taken through the **plasma** nozzle.

plasma nozzle 10
material 12
plasma 14
swirler 24
internal electrode 28
guide tube 32
arc 38
Dwg.1/3

FS CPI EPI
FA AB; GI
MC CPI: A09-A; A11-C04E; F01-H06
EPI: X12-D07B9; X14-F
PLE UPA 20000606
[1.1] 018; P0000; S9999 S1070-R; S9999 S1569; S9999 S1218 S1070; L9999 L2802; L9999 L2506-R; M9999 M2802
[1.2] 018; ND07; ND05; J9999 J2915-R; K9427; N9999 N7227 N7023; B9999 B5492 B5403 B5276; N9999 N6177-R; K9416; K9392; B9999 B5390 B5276; Q9999 Q7352 Q7330; Q9999 Q7374-R Q7330; K9596 K9483; K9530 K9483; N9999 N6633 N6611; N9999 N5856; N9999 N5798 N5787 N5765; B9999 B5481 B5403 B5276; N9999 N7090 N7034 N7023; K9574 K9483
[2.1] 018; P0000
[2.2] 018; Q9999 Q7158-R Q7114; Q9999 Q6644-R; N9999 N7147 N7034 N7023; K9574 K9483; K9518 K9483

L136 ANSWER 9 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2000-187718 [17] WPIX
DNN N2000-139227 DNC C2000-058660
TI **Exhaust** gas device of **plasma** CVD **apparatus** for semiconductor devices, has **cooling** pipe provided in **exhaust** gas line to liquefy diffusion **pump** oil **exhausted** along with **exhaust** gas of reactor.
DC J01 L03 M13 P84 U11
IN HASHIZUME, J; OKAMURA, R; UEDA, S

PA (CANO) CANON KK; (HASH-I) HASHIZUME J; (OKAM-I) OKAMURA R; (UEDA-I) UEDA S
CYC 2
PI JP 2000031074 A 20000128 (200017)* 16p H01L021-205
US 6203618 B1 20010320 (200118) C23C016-00
US 2001007174 A1 20010712 (200143) C23C016-00
ADT JP 2000031074 A JP 1999-80054 19990324; US 6203618 B1 US 1999-277815 19990329; US 2001007174 A1 Div ex US 1999-277815 19990329, US 2001-771715 20010130
FDT US 2001007174 A1 Div ex US 6203618
PRAI JP 1998-103766 19980331
IC ICM C23C016-00; H01L021-205
ICS C23C014-34; C23C016-44; C23C016-50; G03G005-00; G03G005-08; H01L021-3065; H01L021-31
AB JP2000031074 A UPAB: 20000405

NOVELTY - The device has a **cooling** pipe (105) in an **exhaust** gas line (104) provided between a diffusion **pump** (102) and an **auxiliary pump** (103), to liquefy diffusion **pump** oil **exhausted** along with an **exhaust** gas. Liquefied oil collected in an oil reservoir is ejected, when a valve between the oil reservoir and the **exhaust** gas line is closed.

DETAILED DESCRIPTION - The diffusion **pump exhausts** the inside of a reactor (101) of **plasma** CVD **apparatus.** The reactor is provided with a pipe for **introduction** of reaction **gas**. The **cooling** pipe is provided to the inner wall of the **exhaust** gas line or to the periphery of the **exhaust** gas line. The **cooling** pipe through which a **coolant** flows is **spirally** provided to the **exhaust** gas line. The **exhaust** gas line has a threshold portion (109) at the vicinity of the **auxiliary pump**. The oil reservoir connected to the **exhaust** gas line has a switching valve, an oil **exhaust** valve, a leak valve and evacuation valve. The switching valve is provided between the oil reservoir and the **exhaust** gas line. Lamp black in the diffusion oil which has been **exhausted** along with the **exhaust** gas of the reactor is liquefied in the **exhaust** gas line, due to the **cooling** provided in the **exhaust** gas line. The switching valve is opened and the oil **exhaust** valve of the oil reservoir is closed and liquefied diffusion pump oil is collected in the reservoir, from the **exhaust** gas line. The switching valve is closed and oil **exhaust** valve is opened so that liquefied oil is ejected out and recycled to the diffusion pump. An oil receptacle is provided to pass oil to the diffusion pump. The opening-closing valve is provided between the oil receptacle and the **exhaust** gas line. The oil receptacle is maintained in an airtight vacuum state, and it has an evacuation valve. The pressure inside the reactor is 10 mPa or more and 15 Pa or less. The reactor is used for deposition of a film on a base material accommodated in a container. The reactor may also be used for sputtering process executed under vacuum or for etching processes. The **exhaust** gas is finally **exhausted** by the **auxiliary pump**. INDEPENDENT CLAIMS are also included for the following: (i) **Exhaust** gas method; (ii) Film deposition; (iii) Film deposition **apparatus**. The threshold portion in the **exhaust** gas line is provided such that liquefied oil in **exhaust** gas does not flows to the **auxiliary pump**. Similarly, since the **exhaust** gas line is connected to the lower portion of the diffusion pump and to the top portion of the **auxiliary pump**, the liquefied oil in the **exhaust** gas does not flow into the **auxiliary pump**. Both the **pumps** used are vacuum pumps. The base material is processed to be used in electrophotographic photoreceptors.

USE - For **plasma** CVD **apparatus** to form photoreceptor device, line sensors for image input, image pick-up device, photovoltaic device, etc and for sputtering **apparatus** to form insulated films for optical elements, metal wiring, etc, and for etching **apparatus**.

ADVANTAGE - Since the lamp black in the diffusion pump oil is liquefied in the **exhaust** gas line, the oil flow to the **auxiliary pump** is prevented. Even when raw material gas of a large rate of flow is **exhausted,** the oil in the diffusion pump is not reduced abruptly, therefore the pump maintenance is reduced. The film formed in the reactor is free form contamination and has excellent reproducibility. The manufacturing time is less. The deposited film has good quality. Film thickness **control** is easy. The **exhaust** gas device and the **exhaust** method are economical. Since the diffusion pump oil is prevented from flowing to the **auxiliary pump,** the abrasion of the **auxiliary pump** is prevented and hence the maintenance cost for the **auxiliary pump** is reduced. DESCRIPTION OF DRAWING - The figure shows the model diagram of deposition film forming **apparatus**. (101) Reactor; ; (102) Diffusion **pump;** ; (103) **Auxiliary pump;** ; (104) **Exhaust** gas line; ; (105) **Cooling** pipe; ; (109) Threshold portion.
Dwg.1/14

FS CPI EPI GMPI
FA AB; GI
MC CPI: L04-C01B; L04-D04; L04-D10; M13-F
EPI: U11-C01B; U11-C07A1

L136 ANSWER 10 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2000-173227 [16] WPIX
DNN N2000-128962 DNC C2000-054009
TI Production of semiconductor layer e.g., of non-monocrystalline silicon type by **plasma** chemical vapor deposition.
DC L03 U11 V05 X14 X15
IN FUJIOKA, Y; KANAI, M; KODA, Y; OKABE, S; SAKAI, A; SAWAYAMA, T; YAJIMA, T
PA (CANO) CANON KK; (FUJI-I) FUJIOKA Y; (KANA-I) KANAI M; (KODA-I) KODA Y; (OKAB-I) OKABE S; (SAKA-I) SAKAI A; (SAWA-I) SAWAYAMA T; (YAJI-I) YAJIMA T
CYC 28
PI EP 977246 A2 20000202 (200016)* EN 32p H01L021-205
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
CN 1244031 A 20000209 (200026) H01L021-205
JP 2000104174 A 20000411 (200029) 18p C23C016-517
US 6287943 B1 20010911 (200154) H01L021-20
US 2002001924 A1 20020103 (200207) C30B001-00
ADT EP 977246 A2 EP 1999-114935 19990730; CN 1244031 A CN 1999-111914 19990730; JP 2000104174 A JP 1999-218660 19990802; US 6287943 B1 US 1999-363825 19990730; US 2002001924 A1 Div ex US 1999-363825 19990730, US 2001-912343 20010726
~~FDT US 2002001924 A1 Div ex US 6287943~~
PRAI JP 1998-216734 19980731; JP 1998-216733 19980731
IC ICM C23C016-517; C30B001-00; H01L021-20; H01L021-205
ICS C23C016-50; H01L021-36; H01L031-0392; H01L031-04; H01L031-20
AB EP 977246 A UPAB: 20000330
NOVELTY - Bias power of direct current power and/or high frequency power of radio frequency (RF) are supplied together with high frequency power of very high frequency to **discharge** chamber (102). Direct current component of electric current flowing into bias **electrode** (113) is **controlled,** in terms of current density based on area of an inner wall of chamber (102).

DETAILED DESCRIPTION - A process for manufacturing a semiconductor layer involves **introducing** a raw **gas** into a **discharge** chamber (102) and **supplying** high-frequency power to the chamber to decompose the raw gas by **discharge,** thereby forming a semiconductor layer on a substrate (107) within the chamber (102). The process comprises: (a) supply high frequency power of at least very high frequency; (b) supplying bias power of direct current power and/or high frequency power of radio frequency (RF) together with the high frequency power of VHF to chamber (102); and (c) **controlling** a direct current component of an electric current flowing into an **electrode** (113), to which bias power is supplied, to be 0.1 to 10 A/m2 in terms of a current density based on the area of an inner wall of the chamber (102).

INDEPENDENT CLAIMS are also included for the following:

(a) A process for producing a semiconductor layer which comprises: supplying high frequency power of VHF to at least two **discharge** chambers (102); **supplying** bias power of different levels from each other to the chambers, according to respective film-forming conditions in the chambers; and **controlling** the electric potential of each **electrode** (113) to which bias power is supplied, to the same level as that of the substrate (107) or positive potential against the substrate.

(b) A process for manufacturing a photovoltaic cell which comprises: supplying high-frequency power of at least VHF in the step of forming the i-type semiconductor layer; supplying bias of direct current power or RF together with the high frequency power of VHF to **discharge** chamber (102); and **controlling** a direct current component of an electric current flowing into an **electrode** (113) to which bias power is supplied, to be 0.1 to 10 A/m2 in terms of current density based on the area of an inner wall of the chamber (102).

(c) An **apparatus** for producing a semiconductor layer, the **apparatus** comprising: a means (105) for supplying high-frequency power of at least VHF; a means for supplying bias power of direct current power and/or high-frequency power of RF together with high frequency power of VHF to the **discharge** chamber (102); and a means for **controlling** direct current component of an electric current flowing into an **electrode** (113), to which bias power is supplied, to be 0.1 to 10 A/m2 in terms of a current density based on the area of an inner wall of the chamber (102).

USE - Process and **apparatus** for forming a semiconductor layer on a substrate especially a semiconductor layer of the non-monocrystalline silicon type such as amorphous silicon, amorphous silicon germanium, amorphous silicon carbide or amorphous silicon which is used in solar cells, photosensitive drums for photocopying machines, image sensors for facsimiles, thin film transistors for liquid crystal display devices etc..

ADVANTAGE - A good-quality semiconductor layer can be deposited over a large area at a high speed.

DESCRIPTION OF DRAWING(S) - The diagram shows a cross-sectional view of the **apparatus** for forming a semiconductor layer.

Vacuum vessel 101
Film forming chamber (**discharge** chamber) 102
Gas inlet pipe 103
Exhaust pipe 104
High frequency power source 105
Rod **electrode** 106
Moving substrate 107
Heater 109
Direct current power source 110
Ammeter 111

Choke **coil** 112
Bias **electrode** 113
Dwg.1/7
TECH EP 977246 A2 UPTX: 20000330
TECHNOLOGY FOCUS - ELECTRONICS - Preferred Method: The electric potential of **electrode** (108) to which bias power is supplied is **controlled** to the same level as that of the substrate (107) or positive potential against the substrate. The potential difference between **electrode** (113) and substrate (107) is **controlled** to 0 - 500 V. The substrate (107) and inner wall surface of chamber (102) are **controlled** to earth potential. Bias power is supplied to an **electrode** (113) independent of the **electrode** (106) to which high-frequency of RF is supplied. Direct current power is used as bias power.
A band-like substrate or conductive substrate is used. The substrate is used as part of the inner wall of the chamber.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Materials: A raw gas comprising a silicon atom-containing molecule is used as the raw gas to form a silicon-type non-monocrystalline semiconductor layer on the substrate. The semiconductor layer is formed in accordance with a **plasma** chemical vapor deposition method.
FS CPI EPI
FA AB; GI
MC CPI: L04-C01B; L04-D01; L04-D04
EPI: U11-C01B; U11-C09B; U11-C09C; V05-F05C1; V05-F05E5A; X14-F02; X15-A02B
DRN 1666-U

L136 ANSWER 11 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 2000-081250 [07] WPIX
DNN N2000-064514 DNC C2000-023068
TI Elevation pin guide structure of vacuum processing **apparatus** used in surface treatment of liquid crystal display substrate - has insulator bush that is covered by porous ceramic layer to support substrate.
DC L03 M13 U11
PA (MATU) MATSUSHITA DENKI SANGYO KK; (MATU) MATSUSHITA ELECTRIC IND CO LTD
CYC 3

PI JP 11329977	A	19991130	(200007)*	4p	H01L021-205
KR 99088342	A	19991227	(200059)		H01L021-00
TW 417162	A	20010101	(200134)		H01L021-02
JP 3266567	B2	20020318	(200222)	4p	H01L021-205

ADT JP 11329977 A JP 1998-135609 19980518; KR 99088342 A KR 1999-17615 19990517; TW 417162 A TW 1999-107661 19990512; JP 3266567 B2 JP 1998-135609 19980518
FDT JP 3266567 B2 Previous Publ. JP 11329977
PRAI JP 1998-135609 19980518
IC ICM H01L021-00; H01L021-02; H01L021-205
~~ICS C23C014-00; C23C016-44; C23C016-50; H01L021-203; H01L021-3065;~~ H05H001-46
AB JP 11329977 A UPAB: 20000209
NOVELTY - The bush consists of porous ceramic is arranged in between a susceptor and the inert **gas supply** path. An elevation pin that conveys the substrate is guided by a bushing (11). The bushing has an insulator bush (11a) covered by the porous ceramic layer (11b).
DETAILED DESCRIPTION - The substrate is supported by the susceptor in the vacuum chamber. The pressure in the vacuum chamber is **controlled** by the vacuum pump. The reaction **gas** is **supplied** to the vacuum chamber. The high frequency power is supplied by a power supply

to generate **plasma** in the vacuum chamber. The inert gas used as heating medium is supplied to the gap between the substrate and the susceptor to **control** temperature of the substrate.

USE - In vacuum processing **apparatus** used in surface treatment by dry etching, chemical vapor deposition, sputter for substrate like semiconductor wafer, liquid crystal display substrate.

ADVANTAGE - Prevents glow discharge of inert gas by extending flow path of inert gas in **spiral groove** or in porous ceramic. Prevents damage to substrate by abnormal discharge. DESCRIPTION OF DRAWING(S) - The figure shows the cross sectional view of bushing. (11) Bushing; (11a) Insulator bush; (11b) Porous ceramic layer.

Dwg.2/5

FS CPI EPI
FA AB; GI
MC CPI: L04-D04; M13-E07
EPI: U11-C09X; U11-F02A1

L136 ANSWER 12 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1998-136424 [13] WPIX
DNN N1998-108248 DNC C1998-044637
TI **Plasma** chemical vacuum deposition **apparatus** for manufacturing large area thin film - has alternator which **controls** either phase and/or excitation frequency independently.
DC L03 U11 U14
PA (MITO) MITSUBISHI JUKOGYO KK
CYC 1
PI JP 10012558 A 19980116 (199813)* 7p H01L021-205
ADT JP 10012558 A JP 1996-167229 19960627
PRAI JP 1996-167229 19960627
IC ICM H01L021-205
ICS C23C016-50
AB JP 10012558 A UPAB: 19980406
The **apparatus** includes a reactor vessel (1) which has units for **introduction** and **discharge** of reaction gas. A ground **electrode** and an **electrode** for **plasma** generation are accommodated in the reaction vessel. A power supply supplies electric power for glow **discharge** between ground **electrode** and **electrode** for **plasma** generation. Two pairs of solenoid **coils** (14a-14d) are installed mutually opposing on either sides of the reaction vessel with their axis in mutually orthogonal direction. A set of alternators (16a-16d) supplies electric power to the solenoid **coils** for magnetic field generation. A non-crystalline thin film is formed on a substrate which is supported orthogonally in the electric field between the **electrodes**. The alternator **controls** either a phase or an excitation frequency or both independent of each other.

ADVANTAGE - Uniform quality non-crystalline thin film formed at high film forming velocity in large area.

Dwg.2/8

FS CPI EPI
FA AB; GI
MC CPI: L04-D01; L04-D04
EPI: U11-C01B; U11-C09B; U11-C09C; U14-H01A

L136 ANSWER 13 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1996-507963 [51] WPIX
DNN N1996-427996
TI **Plasma** e.g. wafer processing method for specimen, with independent density distribution **control** of **plasma** - with density distribution **controlled** by position adjustment of

electron cyclotron resonance or magnetic field gradient, based on type of material constituting specimen.
AW SEMICONDUCTOR SUBSTRATE.
DC U11 V05
IN EDAMURA, M; KANAI, S; NISHIO, R; TETSUNORI, K; YOSHIOKA, K; KAJI, T
PA (HITA) HITACHI LTD; (HITA) HITACHI SEISAKUSHO KK
CYC 7
PI EP 743671 A2 19961120 (199651)* EN 21p H01J037-32
R: DE GB IT
JP 09106900 A 19970422 (199726) 13p H05H001-46
EP 743671 A3 19970716 (199740)
SG 50732 A1 19980720 (199838)
TW 339497 A 19980901 (199901) H05H001-18
US 6034346 A 20000307 (200019) B23K010-00
US 6172321 B1 20010109 (200104) B23K010-00
JP 2001358131 A 20011226 (200206) 11p H01L021-3065
ADT EP 743671 A2 EP 1996-303508 19960517; JP 09106900 A JP 1996-124351 19960520; SG 50732 A1 SG 1996-9821 19960517; TW 339497 A TW 1996-105920 19960518; US 6034346 A US 1996-649190 19960517; US 6172321 B1 Div ex US 1996-649190 19960517, US 1999-433551 19991104; JP 2001358131 A Div ex JP 1996-124351 19960520, JP 2001-109408 19960520
FDT US 6172321 B1 Div ex US 6034346
PRAI JP 1995-202016 19950808; JP 1995-120992 19950519
REP 3.Jnl.Ref; DE 4118973; DE 4337119; EP 357824; EP 468886; EP 607797; JP 04358077; JP 06112161; JP 07022397; US 4906900; US 5024716; US 5134965; US 5321222
IC ICM B23K010-00; H01J037-32; H01L021-3065; H05H001-18; H05H001-46
ICS C23C016-50; C23C016-511; C23C016-52; C23F004-00; H01L021-205
AB EP 743671 A UPAB: 19961219
The **plasma** processing method has a **plasma** density distribution which is independently **controlled** by a position adjustment of magnetic field gradient or electron cyclotron resonance on the basis of the kind of material the specimen is made of.
The specimen is uniformly processed by independently **controlling** its **plasma** density distribution, gas distribution and bias distribution. The processing **appts.** has a microwave introduction waveguides (A1-4), a magnetic field **coils** giving an ECR plane, a process chamber (A6), a **gas supply** device, a specimen stage (A10) for holding a wafer, and a vacuum evacuating device for the chamber.
USE/ADVANTAGE - For processing e.g. semiconductor wafer or substrate by generating **plasma** using microwave and high frequency wave in frequency range of 10 to 100 MHz. Generates high density **plasma** of industrially required level, while preventing production of foreign matter in process chamber caused by abnormal **discharge**. Avoids lack of processing uniformity caused by absence of grounding **electrode**.
Dwg.1/16
FS EPI
FA AB; GI
MC EPI: U11-C07A1; U11-C09B; U11-C09C; V05-F05C1A; V05-F05C3; V05-F05E3

L136 ANSWER 14 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1995-199843 [26] WPIX
DNN N1995-156959
TI Metallic material flaw detecting using alternative saturating field - disposing first **coil** in registry with **surface** area of metallic tested object then driving prim **coil** with excitation signal selected in its characteristics.
DC S03 X25

IN BEBICK, P J; BROOKS, R A; YOU, Z
PA (MAGN-N) MAGNETIC ANALYSIS CORP
CYC 1
PI US 5418459 A 19950523 (199526)* 11p G01N027-90
ADT US 5418459 A US 1993-134097 19931008
PRAI US 1993-134097 19931008
IC ICM G01N027-90
ICS G01N027-82
AB US 5418459 A UPAB: 19950705
The method involves detecting an arc **discharge** in at least one power cable, followed by supplying a signal representing the presence of the arc **discharge** to a power **supply control**,
A **control** signal id then provided from the power supply **control** sufficient to cause the at least one circuit breaker to open interrupting supply of power from the power supply board to an affected power cable.
The detecting is conducted by a device of a microwave antenna and a microwave receiver which upon detecting a **plasma** noise provides the arc **discharge**-representing signal to the power supply **control**. The microwave antenna is positioned above the at least one power cable and is responsive to radiation in a 1 MHz to 3 GHz frequency range.
USE/ADVANTAGE - For supplying power for **equipment** within office such as central telephone **exchange** office using DC power. Provision for timely detection of arc **discharge** in DC power cable and to shut down **equipment** prior to occurrence of arc **discharges** which could lead to cable fire.
Dwg.1/6
FS EPI
FA AB; GI
MC EPI: S03-E11A; X25-A02B; X25-Q

L136 ANSWER 15 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1995-188901 [25] WPIX
CR 1995-188900 [25]; 1995-188902 [25]; 1995-210294 [28]; 1995-210295 [28]; 1995-210423 [28]; 1995-210424 [28]; 1995-210425 [28]; 1995-210426 [28]; 1995-258609 [34]; 1996-007943 [01]; 1998-390698 [34]; 1998-390699 [34]; 2002-543031 [58]
DNN N1995-148194
TI **Plasma** processing **apparatus** for processing semiconductor wafer - uses pressure **controller** to **control** pressure of gas as per pressure detection value of pressure detector which is based on heat conduction.
DC L03 M13 M14 U11 V05 X14
IN ISHII, N
PA (TKEL) TOKYO ELECTRON LTD; (TKEL) TOKYO ELECTRON TOHOKU KK
CYC 4
PI JP 07106315 A 19950421 (199525)* 6p H01L021-3065
US 5529657 A 19960625 (199631) 32p H05H001-00
~~TW 285813 A 19960911 (199704) H05H001-00~~
JP 3173692 B2 20010604 (200133) 6p H01L021-3065
KR 264445 B1 20001101 (200139) H01L000-00
ADT JP 07106315 A JP 1993-273139 19931004; US 5529657 A US 1994-317490 19941004; TW 285813 A TW 1994-109091 19941001; JP 3173692 B2 JP 1993-273139 19931004; KR 264445 B1 KR 1994-25300 19941004
FDT JP 3173692 B2 Previous Publ. JP 07106315
PRAI JP 1993-273139 19931004; JP 1993-273138 19931004; JP 1993-273140 19931004; JP 1993-284207 19931020; JP 1993-284211 19931020; JP 1993-284206 19931020
IC ICM H01L000-00; H01L021-3065; H05H001-00

ICS C23C016-507; H01L021-02; H01L021-203; H01L021-205; H01L021-68; H01Q009-27; H05H001-46
AB JP 07106315 A UPAB: 20020916
The **apparatus** passes a high frequency current to a high frequency antenna (7) placed at exterior of a chamber (2). The electromagnetic field formed by the flow of current, generates a **plasma** in an air-tight chamber. A processing **gas** is **supplied** between the clearance of a wafer (w) and a position stand, for temperature adjustment of the wafer. A gas pressure detector (55), a gas pressure **controller** (56) and a **coolant** reservoir (35) are provided for temperature adjustment. The flow of gas is **controlled** as per the detected value of the pressure detector which depends upon heat conduction.
ADVANTAGE - Performs good **plasma** processing at low pressure, reliably. Maintains wafer at predetermined temperature.
Dwg.1/5
ABEQ US 5529657 A UPAB: 19960808
A **plasma** processing **appts**. comprising: a chamber having a gas inlet **port** and a gas **discharge** **port**; supporting device, disposed in the chamber, for supporting an object to be processed which has a surface to be processed; a flat **coil** provided to oppose the surface to be processed of the object which is supported by the supporting device, with a gap between them; RF power supply device for supplying an RF current to the **coil**, thereby generating a **plasma** in the chamber between the **coil** and the supporting device; and directing device, provided to the supporting device to surround the object to be processed, and having a projecting portion projecting toward the **coil** past the **surface** to be processed of the object to be processed, and including an electrical insulator or a high resistance, for focussing the **plasma** in a direction parallel to the surface of the object to be processed; where the directing device has an outer annular member consisting of an electrical insulator or a high ohmic resistance, and an inner annular member arranged between the outer annular member and the object to be processed and consisting of a conductor.
Dwg.1/31
FS CPI EPI
FA AB; GI
MC EPI: U11-C09C; V05-F05C1; V05-F05E5; X14-F02

L136 ANSWER 16 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1993-222011 [28] WPIX
DNN N1993-170296 DNC C1993-098781
TI **Discharge plasma** generating **appts**. for generation irrespective of gas pressure - comprises ring shaped magnetic materials round periphery of piping, **coil** round material, inner **electrode** and applied AC voltage.
DC M13 X14
PA (EBAR) EBARA CORP
CYC 1
PI JP 05144594 A 19930611 (199328)* 4p H05H001-46
ADT JP 05144594 A JP 1991-330057 19911119
PRAI JP 1991-330057 19911119
IC ICM H05H001-46
ICS B01D053-32; B01D053-34
AB JP 05144594 A UPAB: 19931116
The **appts**. comprises ring-shaped magnetic materials around the outer periphery of the piping, and a **coil** is wound around the magnetic material and an **electrode** is placed inside the piping to enhance **discharge** while **supplying** a low pressure

exhaust or a specified-gas at lower than the atmospheric pressure; and an AC voltage is applied to the **coil** to generate **discharge plasma** inside the piping.

The **discharge** initiation **plasma** generation is pref. **controlled** by setting the frequency of the AC voltage applied to the **coil**.

USE/ADVANTAGE - Enables generation of **discharge plasma** irrespective of gas pressure, as an intense electric field may be applied by varying the arrangement of the **electrodes** inside the piping or the frequency of the voltage applied to the **coil**.

Dwg.0/4

FS CPI EPI
FA AB
MC CPI: M13-E07
EPI: X14-F

L136 ANSWER 17 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1992-301619 [37] WPIX
DNN N1992-230743 DNC C1992-134399
TI **Appts**. for reactive coating of substrate - including AC source with two non-earthed leads, vacuum chamber, magnets, cathodes, targets etc., and prevents unwanted coating of process chamber.
DC M13 U11 V05
IN LATZ, R; SCHANZ, M; SCHERER, M; SZCZYRBOWSKI, J
PA (LEYB) LEYBOLD AG; (BALV) BALZERS & LEYBOLD DEUT HOLDING AG; (LEYB) LEYBOLD HERAEUS GMBH & CO KG
CYC 9

PI EP 502242	A2	19920909	(199237)*	DE	5p	C23C014-35
R: CH DE FR GB LI NL						
DE 4106770	A	19920910	(199238)		4p	C23C014-35
JP 04325680	A	19921116	(199252)			C23C014-54
US 5169509	A	19921208	(199252)		4p	C23C014-54
EP 502242	A3	19931215	(199514)			C23C014-35
DE 4106770	C2	19961017	(199646)		4p	C23C014-35
EP 502242	B1	19970827	(199739)	DE	5p	C23C014-35
R: CH DE FR GB LI NL						
DE 59108836	G	19971002	(199745)			C23C014-35
KR 239818	B1	20000115	(200116)#			C23C014-35

ADT EP 502242 A2 EP 1991-116294 19910925; DE 4106770 A DE 1991-4106770 19910304; JP 04325680 A JP 1992-45175 19920303; US 5169509 A US 1991-697712 19910509; EP 502242 A3 EP 1991-116294 19910925; DE 4106770 C2 DE 1991-4106770 19910304; EP 502242 B1 EP 1991-116294 19910925; DE 59108836 G DE 1991-508836 19910925, EP 1991-116294 19910925; KR 239818 B1 KR 1991-18055 19911014
FDT DE 59108836 G Based on EP 502242
PRAI DE 1991-4106770 19910304; KR 1991-18055 19911014
REP No-SR.Pub; DD 252205; DE 3802852; EP 411359; GB 1172106; US 4166784
IC ICM C23C014-35; C23C014-54
ICS C23C014-06; C23C014-08; H01J037-34
AB EP 502242 A UPAB: 19971030
The installation for reactive coating of substrata with an electrically insulating material consists of an a.c. source (10) connected with cathodes (5, 5a) incorporating magnets (19-19e), and located in an evacuatable coating chamber (15, 15a). The action of these **electrodes** results in targets (3, 3a) to be atomised and their particles to be precipitated onto the substratum (1, 1', 1''). Process and reactive **gases** can be **introduced** into the chamber (15, 15a). Two non-earthed outputs (12, 13), pref. at the secondary **coil** (25) of an a.c. transformer, with each output connected with

one target-carrying cathode, preferably the magnetron cathodes (5, 5a). Both cathodes are located in a **plasma** region (15), with each facing its respective subtratum approximately at the same distance (A ; A). Al, S, Ti, Ta, Zn, Sn, Zr or their cpds. can be used as target materials, with the process and reactive gases being respectively Ar and O (and/or N). The effective **discharge** voltage is measured by a device (20) and the result (as a d.c. voltage) is fed to a **controller** (16) governing the flow of reactive gas from the container (22), with appropriate distribution between the cathodes. The maximum frequency of the a.c. source is limited to 1 MHz. The adjacent cathodes (5, 5a) span an angle 180 - 110 deg..

USE/ADVANTAGE - For coating of substrata with electrically insulating materials which have a high affinity to the reactive gas used. The serious drawback of the known installations in such cases, consisting of parts of the installation being coated, is eliminated together with its harmful consequences (variation of the process parameters, varying coating quality, the need for frequency cleaning of the chamber etc.).
11
Dwg.1/1

ABEQ US 5169509 A UPAB: 19931006

Appts. comprises (a) evacuable coating chamber; (b) device in chamber to distribute process gas; (c) a.c. power supply with two ungrounded outputs; (d) pair of magnetron cathodes enclosing series of magnets and holding target to be sputtered in chamber.

Appts. also comprises (e) device to measure **discharge** voltage of cathode(s), and producing measured voltage; and (f) flow **control** device for flow of reactive gas to distribution device, so that measured voltage is identical to desired voltage.

USE/ADVANTAGE - To reactively sputter coat a substrate with electrically insulating material. Process is uniform and stable content producing arcing.
1/1

ABEQ EP 502242 B UPAB: 19970926

A device for the reactive coating of a substrate (1, 1', 1'') with an electrically insulating material, for example silicon dioxide (SiO2), comprising an a. c. source (10) which is connected to magnetron cathodes (5, 5a), which are arranged in an evacuatable coating chamber (15, 15a) and whose targets (3, 3a) are sputtered and the sputtered particles of which are deposited on the substrates (1, 1', 1''), where two earth-free outputs (12, 13) of the a. c. source (10) are each connected to a magnetron cathode (5, 5a), the two magnetron cathodes being arranged one beside another in a coating chamber (15, 15a) and in each case spaced by approximately the same distance (A1 and A'') from the oppositely disposed substrate (1, 1', 1''), characterised in that the magnetron cathodes (5, 5a) each have an individual distributor pipeline (24, 24a) for the process gas, and the division of the reactive gas flow between the two distributor pipelines (24, 24a) is **controlled** by a regulating device (16) via a conductance regulating valve (18) in such manner that the measured voltage difference of the effective values of the two cathodes (5, 5a) corresponds to a set point voltage, for which purpose the effective values of the voltage effective value detectors (20) connected via lines (14) to the cathodes (15) are measured and fed via lines (21) as direct current voltages to the regulating device (16).
Dwg.1/1

FS CPI EPI
FA AB; GI
MC CPI: M13-E07
EPI: U11-C05B2; U11-C09A; V05-F04B5C; V05-F05C3A; V05-F05E3; V05-F08D1A

L136 ANSWER 18 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1992-269182 [33] WPIX
DNN N1992-205857 DNC C1992-120018
TI **Appts**. for **controlled** vol. delivery of particulates - has container movable w.r.t. sampling tube and material fluidisation system.
DC J04 S03
IN DE, SILVA K; GUEVREMONT, R; DE, SILVA K N
PA (DSIL-I) DE SILVA K; (MIMC) CANADA MIN ENERGY
CYC 2
PI CA 2030588 A 19920524 (199233)* 14p G01N001-00
US 5286451 A 19940215 (199407) 7p G01N001-00
ADT CA 2030588 A CA 1990-2030588 19901123; US 5286451 A CIP of US 1991-793150 19911118, US 1993-64366 19930521
PRAI CA 1990-2030588 19901123
IC ICM G01N001-00
ICS B01L003-02; B65G053-04; G01N021-00
AB CA 2030588 A UPAB: 19931006
Appts. comprises an elongate container (1), and a tubular member (3) with sample receiving inlet (4) for insertion into the container. The container is movable w.r.t. the member along a common longitudinal axis at a rate selected to give the required sample delivery rate. A fluidising system agitates the material (2) surface in the container during the movement.
An enclosure (13) around the container opening and member inlet is **supplied** with **gas** for transporting fluidised material from the container. The enclosure pref. has an opening (8) for container removal and the opening and a container support (5) have mating separable sealing surfaces. The movement pref. permits the member to reach to the bottom of the container for complete removal of the material.
USE/ADVANTAGE - For delivering solids for analysis e.g. by inductively coupled **plasma** atomic emission spectrometry, can provide delivery at constant vol. rate independently of other operating parameters such as gas pressure or flow rate.
1/4
ABEQ US 5286451 A UPAB: 19940329
Appts. for **controlled** vol. delivery of particulate material comprises a tube (53) with material receiving inlet insertable into an elongate container (51) with a material inlet. The tube can be linearly traversed w.r.t. the container along a common longitudinal axis and towards the surface of material (52) in the container at a predetermined rate to give the required delivery rate. The tube can be vibrated or rotated to agitate and fluidise the material surface, and a carrier gas takes fluidised material through the tube, optionally to an analyser. There may be a **spiral groove** (55) in the tube exterior to form a gas passage for sweeping residual particles from the container wall.
USE/ADVANTAGE - E.g. for supplying a solid sample for inductively coupled **plasma** atomic emission spectrometry. Provides **controlled** delivery at predetermined constant vol. rate independent of gas pressure or flow rate.
Dwg.5/5
FS CPI EPI
FA AB; GI
MC CPI: J04-B
EPI: S03-E13

L136 ANSWER 19 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1991-142077 [20] WPIX
DNN N1991-109372 DNC C1991-061113

TI **Plasma** torch provided with electromagnetic **coil** - for rotation of arc seating to protect electrode surfaces.
DC M23 P55 X14 X24
IN FEUILLERAT, J; LABROT, M; LAUTISSIER, P; MULLER, S G R
PA (NRDA) SOC NAT IND AEROSPATIALE
CYC 16
PI EP 427590 A 19910515 (199120)* 8p
R: AT BE CH DE ES GB IT LI NL SE
CA 2029508 A 19910509 (199129)
FR 2654295 A 19910510 (199131)
JP 03171599 A 19910725 (199136)
US 5132511 A 19920721 (199232) 5p B23K009-00
EP 427590 B1 19940824 (199433) FR 7p H05H001-28
R: AT BE CH DE DK ES GB IT LI NL SE
DE 69011814 E 19940929 (199438) H05H001-28
ES 2060984 T3 19941201 (199504) H05H001-28
JP 3006720 B2 20000207 (200012) 4p H05H001-34
KR 146046 B1 19980817 (200022) H05H001-34
CA 2029508 C 20000502 (200037) FR H05H001-28
ADT EP 427590 A EP 1990-403044 19901029; FR 2654295 A FR 1989-14675 19891108; JP 03171599 A JP 1990-301243 19901108; US 5132511 A US 1990-609993 19901107; EP 427590 B1 EP 1990-403044 19901029; DE 69011814 E DE 1990-611814 19901029, EP 1990-403044 19901029; ES 2060984 T3 EP 1990-403044 19901029; JP 3006720 B2 JP 1990-301243 19901108; KR 146046 B1 KR 1990-17993 19901107; CA 2029508 C CA 1990-2029508 19901107
FDT DE 69011814 E Based on EP 427590; ES 2060984 T3 Based on EP 427590; JP 3006720 B2 Previous Publ. JP 03171599
PRAI FR 1989-14675 19891108
REP EP 32100; US 3832519; US 4034250
IC ICM B23K009-00; H05H001-28; H05H001-34
ICS B23K010-00; H05B007-10; H05B007-103; H05B007-12; H05H001-40
AB EP 427590 A UPAB: 19930928
A **plasma** torch incorporating an electromagnetic **coil** for rotating the arc is claimed of the type that comprises two tubular and coaxial electrodes (5,6), one extending from the other, each being arranged in a support (3,4); some means of **cooling** the electrodes comprising a sealed cylindrical chamber (16), provided in the corresponding support and separated by a cylindrical wall dividing the chamber into two annular spaces (16A, 16B) that are connected and through which flows a **cooling** fluid; some means (9) for striking an electric arc between the two electrodes; some means (11,13) for **injecting** a plasmagenic **gas** between the two electrodes; and an electromagnetic **coil** for displacing the hanging root of the electric arc on the internal surface of the two electrodes.
The **cooling** fluid for the electrodes, for which the sealed chamber (16) incorporates the separation wall, is electrically insulating and the electromagnetic **coil** (15) serves as the separation wall.
USE/ADVANTAGE - The **plasma** torch is of the type in which a **plasma** is obtained by heating a gas by an electric arc produced ~~between two electrodes. It provides a torch that is less cumbersome and~~ eliminates the need for external auxiliary **equipment** whilst allowing a **control** system to be connected to assure efficient operation of the torch. Premature wear of the electrode surfaces is prevented by unhooking the arc from the electrode surface by means of the electromagnetic **coil**.
1/2
ABEQ US 5132511 A UPAB: 19930928
Plasma torch comprises (a) two tubular coaxial axially-spaced electrodes, in support; (b) means to **inject plasma gas** between electrodes; (c) means to initiate electric arc between

electrodes; (d) **cooling** device; and (e) cylindrical electromagnetic **coil** to move catching feet of electric arc onto internal surfaces of the electrodes.

Cooling device comprises sealed cylindrical chamber between one of the electrodes and its support, through which **cooling** fluid passes, for electrically non-conductive **cooling**. The electromagnetic **coil** forms a cylindrical sepn. wall dividing the sealed chamber into two annular spaces through which fluid can circulate.

ADVANTAGE - Spatial requirement for **plasma** torch is much reduced. **Appts**. is simplified.

2/2

ABEQ EP 427590 B UPAB: 19941010

Plasma torch of the type including: - two tubular and coaxial electrodes (5 and 6) in extension of each other, each electrode in extension of each other, each electrode (5 and 6) being arranged in a support (3 and 4); - means (8.1, 8.2) for **cooling** the said electrodes, which means are passed through by a **cooling** fluid, the said means for **cooling** at least one of the said electrodes comprising a leaktight cylindrical chamber (16), provided in the corresponding support and separated by a cylindrical separating wall dividing the chamber into two annular spaces (16A and 16B) in communication with each other at one end of the said wall and through which the said **cooling** fluid flows; - means (9) for igniting an electric arc between the two electrodes; - means (11, 12, 13) for **injecting** a **plasma**-generating **gas** between the two electrodes; and, - electromagnetic **coil** means (15) for displacing the anchoring feet (10.1, 10.2) of the electric arc (10) over the internal surfaces of the said electrodes, characterised in that the fluid for **cooling** the said electrode, the leaktight chamber (16) of which includes the separating wall, is electrically insulating and in that the said electromagnetic **coil** (15) acts as the said cylindrical separating wall.

Dwg.1/2

FS CPI EPI GMPI
FA AB; GI
MC CPI: M23-D01B1
EPI: X14-F; X24-D05

L136 ANSWER 20 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1991-087170 [12] WPIX
CR 1989-323774 [44]; 1991-339618 [46]; 1991-339619 [46]; 1991-339620 [46]; 1992-381874 [46]
DNN N1991-067373 DNC C1991-037030
TI **Plasma** arc torch - having nozzle spatter shield and secondary air **cooling** and arc stabilising system.
DC M23 P55 X24
IN COUCH, R W; SANDERS, N A
PA (HYPE-N) HYPERTHERM INC
CYC 17
~~PI WO 9102619 A 19910307 (199112)* 36p~~
RW: AT BE CH DE DK ES FR GB IT LU NL SE
W: AU CA JP

AU 9061623	A	19910403	(199125)			
EP 487573	A1	19920603	(199223)	EN	36p	B23K009-00
R: CH DE FR GB IT LI SE						
US 5120930	A	19920609	(199226)		12p	B23K009-00
US 5132512	A	19920721	(199232)		11p	B23K009-00
JP 05501081	W	19930304	(199314)		10p	B23K010-00
AU 644807	B	19931223	(199407)			H05H001-34
EP 585977	A1	19940309	(199410)	EN	14p	H05H001-34

R: CH DE FR GB IT LI SE
EP 487573 B1 19941123 (199445) EN 17p B23K009-00
R: CH DE FR GB IT LI SE
DE 69014304 E 19950105 (199506) B23K009-00
EP 487573 A4 19920729 (199523)
CA 2065025 C 19951107 (199604) B23K009-29
JP 2739522 B2 19980415 (199820) 16p B23K010-00
EP 585977 B1 19981014 (199845) EN H05H001-34
R: CH DE FR GB IT LI SE
DE 69032704 E 19981119 (199901) H05H001-34

ADT EP 487573 A1 EP 1990-912223 19900710, WO 1990-US3870 19900710; US 5120930 A Cont of US 1988-203440 19880607, US 1989-395266 19890817; US 5132512 A CIP of US 1988-203440 19880609, Cont of US 1989-395266 19890817, US 1991-718953 19910621; JP 05501081 W JP 1990-511517 19900710, WO 1990-US3870 19900710; AU 644807 B AU 1990-61623 19900710; EP 585977 A1 Related to EP 1990-912223 19900710, EP 1993-118339 19900710; EP 487573 B1 EP 1990-912223 19900710, WO 1990-US3870 19900710; DE 69014304 E DE 1990-614304 19900710, EP 1990-912223 19900710, WO 1990-US3870 19900710; EP 487573 A4 EP 1990-912223 ; CA 2065025 C CA 1990-2065025 19900710; JP 2739522 B2 JP 1990-511517 19900710, WO 1990-US3870 19900710; EP 585977 B1 Div ex EP 1990-912223 19900710, EP 1993-118339 19900710; DE 69032704 E DE 1990-632704 19900710, EP 1993-118339 19900710

FDT EP 487573 A1 Based on WO 9102619; US 5120930 A Cont of US 4861962; US 5132512 A CIP of US 4861962; JP 05501081 W Based on WO 9102619; AU 644807 B Previous Publ. AU 9061623, Based on WO 9102619; EP 487573 B1 Based on WO 9102619; DE 69014304 E Based on EP 487573, Based on WO 9102619; JP 2739522 B2 Previous Publ. JP 05501081, Based on WO 9102619; EP 585977 B1 Div ex EP 487573; DE 69032704 E Based on EP 585977

PRAI US 1989-395266 19890817; US 1988-203440 19880607; US 1991-718953 19910621

REP SU 1234104; US 4382170; US 4421970; US 4625094; CH 490154; FR 2391287; FR 2450548; GB 1019848; US 4861962; 1.Jnl.Ref; EP 256525; FR 2383746; JP 60068156; US 3641308

IC ICM B23K009-00; B23K009-29; B23K010-00; H05H001-34
ICS B23K009-013; B23K010-02

AB WO 9102619 A UPAB: 19971006

Appts. comprises a **plasma** arc torch having a body, an electrode, prim. gas passage through the body, a nozzle mounted onto the body, an electrically insulated shield surrounding the nozzle and mounted onto the body and having an exit orifice aligned with the **nozzle** and a secondary **gas** flow passing through the space between the nozzle and the shield to **cool** the shield, with bleed off apertures in the shield angled to form a gas **swirl** to stabilise the exiting torch **plasma**. The secondary flow having flow **control** valves and pipework. A **plasma** arc cutting process is carried out using a torch having a shield which protects the nozzle from molten spatter and incorporated a secondary air flow which both **cools** the shield and forms a gas **swirl** which stabilises the **plasma** arc and which can be **controlled** for either cutting or piercing operations.

USE/ADVANTAGE - The **appts**. and process is useful in the use of **plasma** arc cutting processes and particularly when operating the range between 0-200 amperes, providing a torch which incorporates a shield which prevents molten metal reaching the nozzle and also a secondary air supply to **cool** the shield, bleeding off sufficient to **swirl** and provide a good cut whilst flowing away from the arc to avoid interference with the operation. @(36pp Dwg.No.9/9)@

ABEQ US 5120930 A UPAB: 19930928

Appts. comprises a **plasma** one torch having a body an electrode within the body, a nozzle with an outlet orifice. prim. gas flow

existing through the orifice, an electric current supply to the electrode to produce an arc, an electroconductive shield surrounding the nozzle, insulated from the torch body, with an exist orifice aligned with the nozzle orifice, and a sec. gas flow passing through the body and a space between the shield and body to provide cooking to the shield with bleed-off orfices, angled downward from the shield for passing some of the sec. flow, the remainder forming a **swirling** gas flow to the exit nozzle orifice to stabilise the **plasma** produced by the prim. gas flow, whilst **controlling** the flow rate of the sec. flow dependent upon whether the torch is for piercing or cutting a workpiece.
USE/ADVANTAGE - Useful in **plasma** arc cutting applications providing a cutting torch and system of operation which by using a mechanical shield to block the molten splatter from workpieces onto the **nozzle** and a sec. **gas** flow which both **cools** the shield and provide enhanced prim. flow, the torch is protected from gauging and double arcing without the use of water **cooling** at high operating current levels.

ABEQ US 5132512 A UPAB: 19930928

Plasma arc torch comprises body, electrode within body, nozzle with outlet orifice, means to **introduce** prim **gas** flow through body and means to direct electrical current between electrode and nozzle to produce **plasma** arc exciting torch.

A shield is mounted on the torch body, generally surrounding and spaced from the nozzle, aligned with the nozzle orifice. A device is used to insulate the shield electrically from the body to prevent double arcing.

Device is used to produce sec. gas flow through the body, passing through space between nozzle and shield at a rate sufficient to **cool** the shield. The mechanism has an opening about the exit orifice to bleed off part of the sec. gas flow, at least one opening angled from vertical.

USE/ADVANTAGE - For **plasma** arc cutting torch, partic. operating at 0-200 amps. Nozzle is protected from gouging and double arcing during piercing and cutting of metal workpieces.
9/9

ABEQ EP 487573 B UPAB: 19950102

A **plasma** arc torch (10) having a body, (12) an electrode (14) mounted within the body, an electrically conductive nozzle (16) with an outlet orifice (18) mounted on the body at one end thereof, means for **introducing** a primary gas flow passage through the body (12), between the electrode (14) and the nozzle (16), and exiting through the nozzle outlet orifice (18), means for directing an electrical current between said electrode (14) and said nozzle (16) to produce a **plasma** arc (24) exiting the torch (10) through said nozzle orifice (18) to pierce and then cut a metal workpiece (26), said **plasma** arc (24) impinging on said workpiece (26) where it liquefies and splatters the molten metal (26a), an electrically conductive shield (38) mounted on said torch body (12), said shield (38) generally surrounding said nozzle (16) in a spaced relationship and having an exit orifice (**42**) aligned with said nozzle orifice (18), said exit orifice (**42**) being sufficiently large that it does not interfere with said arc (24), but being sufficiently small that substantially all of the splattered molten metal (26a) strikes the shield (38) without reaching said nozzle (16) and other components of said torch (10), means for insulating said shield (38) electrically from said body (12) to prevent double arcing, said shield (38) being electrically floating, means (50, 52, 54) for producing a secondary gas flow (48) through said body (12), said secondary gas flow (48) passing through the space (40) between said nozzle (16) and said shield (38) at a rate sufficient to **cool** the shield (38), said secondary gas flow means including at least one opening (44'44'') in

said shield (38) in fluid communication with said space (40) and located before said exit orifice (**42**) to bleed off a first portion of the secondary gas flow (48), and a second portion (48a) of the secondary gas flow exiting through said shield exit orifice (**42**), said second portion (48a) being of a velocity that it stabilises the **plasma** (24) produced by said primary gas flow exiting said torch at said nozzle orifice (18) and said shield exit orifice (**42**), characterised in that said at least one opening (44'44'') is angled from the vertical at an angle greater than zero degrees.
Dwg.3A,3B/9

FS CPI EPI GMPI
FA AB; GI
MC CPI: M23-D01B1; M23-D01B2
EPI: X24-D05

L136 ANSWER 21 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1990-255261 [34] WPIX
DNN N1990-197802
TI **Plasma** source using microwave excitation for spectrographic analysis - has coaxial waveguide system, concentric injectors and compressed air **cooling** to achieve stable **plasma control** at high energies.
DC S03 V05 X14
IN KOGA, M; OKAMOTO, Y; YASUDA, M
PA (HITA) HITACHI LTD
CYC 3
PI DE 4004560 A 19900816 (199034)*
JP 02215038 A 19900828 (199040)
US 5086255 A 19920204 (199208)
ADT DE 4004560 A DE 1990-4004560 19900214; JP 02215038 A JP 1989-33579 19890215; US 5086255 A US 1990-473430 19900201
PRAI JP 1989-33579 19890215
IC G01N027-62; H01J007-24; H01J049-10; H01P003-06; H05H001-46
AB DE 4004560 A UPAB: 19930928
A **plasma** source employing microwave excitation has a coaxial waveguide assembly comprising an outer conductive cylinder (40) and a concentric **spirally** wound inner conductor (30). A further concentric assembly of injector tubes is located along the horizontal axis of the waveguide system (30,40) such that the **inner** tube (71) conducts the fluid (90) undergoing examination, whilst the outer element (70) conveys the inert gas (80) for **plasma** generation.

Cooling of the **appts**. is effected by compressed air (60) via the inlet pipe (51) and a perforated protective screen (120) ensures operator safety from stray microwave energy.

USE/ADVANTAGE - Qualitative search for trace elements by observation of light spectrum. Quantitative assessments of elements via ionic emission and mass spectrograph. Stable **plasma** at higher powers. Permits examination of flows in both gaseous and liquid states. Detection sensitivity improves by factor of 10. Easy to set up and use.
1/3

ABEQ US 5086255 A UPAB: 19930928
The microwave induced **plasma** source includes a coaxial waveguide made up of a cylindrical outer conductor and an inner conductor which has the form of a helical **coil**. A **discharge** tube is inserted into the helical **coil** in the axial direction. An inner tube introduces a sample and an outer tube **introduces** a **plasma gas** so that a double tube structure is formed.

A **discharge**-tube **cooling** device causes a **cooling** gas to flow along the outer periphery of the **discharge** tube in directions parallel to the axis. A microwave

power source supplies microwave power to the coaxial waveguide.
USE/ADVANTAGE - When microwave induced **plasma** source is used as light source of spectrometer or ion source of mass spectrometer, trace element can be readily determined qualitatively or quantitatively.

FS EPI
FA AB; GI
MC EPI: S03-A02; S03-E10; V05-J; X14-F

L136 ANSWER 22 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1989-349382 [48] WPIX
DNN N1989-265798 DNC C1989-154806
TI Microwave **plasma** capable of high density and large area - is generated inside **spiral**-shaped internal **electrode** of coaxial structure and **controlled** by magnetic field.
DC J04 M13 P55 X14
IN MURAYAMA, S; OKAMOTO, Y
PA (HITA) HITACHI LTD
CYC 3

PI	DE 3915477	A	19891123	(198948)*	10p	
	JP 01283745	A	19891115	(199001)		
	US 4908492	A	19900313	(199016)	9p	
	JP 08008238	A	19960112	(199611)	7p	H01L021-3065
	DE 3915477	C2	19960502	(199622)	10p	H05H001-30
	JP 2787006	B2	19980813	(199837)	8p	H01J037-32

ADT DE 3915477 A DE 1989-3915477 19890511; JP 01283745 A JP 1988-112563 19880511; US 4908492 A US 1989-347573 19890505; JP 08008238 A Div ex JP 1988-112563 19880511, JP 1995-111717 19880511; DE 3915477 C2 DE 1989-3915477 19890511; JP 2787006 B2 Div ex JP 1988-112563 19880511, JP 1995-111717 19880511
FDT JP 2787006 B2 Previous Publ. JP 08008238
PRAI JP 1988-112563 19880511; JP 1995-111717 19880511
IC B23K009-00; H01J027-16; H01J037-08; H05H001-46
ICM H01J037-32; H01L021-3065; H05H001-30
ICS B23K009-00; C23F004-00; H01J027-16; H01J037-08; H01J037-305; H01J065-04; H05H001-46
AB DE 3915477 A UPAB: 19960322
The **plasma** generator (fig.1) consists of a coaxial cylindrical waveguide which contains a volume of cylindrical shape into which the microwave energy is injected. It features an internal conductor (20) shaped like a **spiral**, and a cylindrical outer conductor (30). A non-conducting **discharge** tube (10) is placed inside the cylindrical volume. The **plasma** (80) of the material to be ionised is formed by the microwave energy inside this tube. It contains pref. an inlet for injection of the material and an opening through which the **plasma** is accessible or light or particles generated by the **plasma** can be emitted.
A magnetic field is pref. generated (90) to give a magnetic field overlapping the microwave field.
USE/ADVANTAGE - The design is more efficient than current designs, it is capable of having a larger dia. **plasma** with better radial homogeneity. The temp. and density of the **plasma** can be made higher. The quality of deposited layers and throughput rates are also higher when film-depsn. is used. When used for trace element analysis it has a higher sensitivity and reduced cost. The contamination level is reduced. The generator is used for surface treatment, trace element analysis and optical-chemical reactions by using the light emitted by the **plasma**.
1A/6
Dwg.1A/6
ABEQ US 4908492 A UPAB: 19930923

Microwave **plasma** prodn. **equipment**, usable as an emission or particle source in etching, deposition, etc., consists of a cylindrical outer conductor (30), a helical inner conductor (20), a **discharge** tube (10) and coaxial wave guide transformer (40). Microwave power is supplied from a generator and is transmitted from the waveguide transformer to the inner conductor to produce a magnetic field in the axial direction, while an electrical field is induced in a direction opposite to current flowing in the inner conductor by magnetic induction. **Gas** is **introduced** from an **injector** (70) into the **discharge** tube and **plasma** (80) is produced.

ADVANTAGE - Stable and efficient prodn. of high-density, low-impurity **plasma**.

1/6

FS CPI EPI GMPI
FA AB; GI
MC CPI: J04-C04; J04-X; M13-E07
EPI: X14-F

L136 ANSWER 23 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1988-234532 [33] WPIX
CR 1984-249556 [40]; 1988-177359 [26]; 1988-263660 [37]
DNN N1988-178339
TI **Plasma** jet ignition **appts**. for IC engine - has timer for **controlling** introduction of hydrogen into cavity, **discharge** of **plasma** generating spark and triggering of magnetic field.
DC Q52 Q54 X22
PA (TOZZ-I) TOZZI L
CYC 1
PI US 4760820 A 19880802 (198833)* 7p
ADT US 4760820 A US 1986-946145 19861223
PRAI US 1986-946145 19861223; US 1983-515557 19830720; US 1984-636169 19840731; US 1985-799255 19851118
IC F02B017-00; F02B019-10; F02P003-08; F02P033-00
AB US 4760820 A UPAB: 19951004

The **appts**. has a plug which has an **electrode** from which a high energy spark is generated. The spark causes hydrogen which is introduced into the **plasma** generation cavity by a fuel line to become **plasma**. The **plasma** generation cavity is defined by a magnetic field generator. The cavity has an inlet opening adjacent the **plasma** generation location and an outlet orifice. The **plasma** is ejected as a **plasma** jet from the cavity from the orifice. The magnetic field generator is disposed as a magnetic field **coil** wound about the cavity. The magnetic field is charged by the **discharge** of a capacitor at the time of the formation of the **plasma** in the cavity.

The magnetic field accelerates the **plasma** out of the cavity through the orifice so that the **plasma** exits as a high velocity jet and achieves effective penetration. A timer is also included for timing the introduction of hydrogen into the cavity, the **discharge** of the **plasma** generating spark and the triggering of the magnetic field.

ADVANTAGE - Reduced fuel ignition delay, faster burning rates, improved fuel economy, reduced emissions. Higher efficiency engine with lean air/fuel mixtures.

1/2

Dwg.1/2

FS EPI GMPI
FA AB; GI

MC EPI: X22-A01E

L136 ANSWER 24 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1987-181611 [26] WPIX
DNN N1987-135888 DNC C1987-075637
TI **Appts**. for simultaneous etching of several specimens by **plasma** - includes rotary magnet for **control** of **plasma** concn. arranged on ferromagnetic disc.
DC L03 M14 U11
PA (HITA) HITACHI LTD
CYC 1
PI JP 62111430 A 19870522 (198726)* 5p
ADT JP 62111430 A JP 1985-250715 19851111
PRAI JP 1985-250715 19851111
IC C23F001-04; H01L021-30
AB JP 62111430 A UPAB: 19930922
Specimens (e.g. such as semiconductor wafers) are put independently on an **electrode** fixed on a bottom of a closed vacuum vessel, the inner pressure of the vessel is reduced and the treating **gas** is **supplied**. Another **electrode** (11) is fixed on the vessel's ceiling portion, so as to face those specimens. The **plasma discharge** grows between these **electrodes** , by a hf source connected to the **electrode** , and thereby the specimens are etched, while **plasma** concn is **controlled** by a rotary magnet rotating under the **electrode** in open air by a motor . Such magnet is formed by arranging two pairs of permanent magnet on a ferromagnetic disc , so that their magnetic poles face opposite to each other, and are formed **spirally** from the disc's centre towards its edge in order of S-pole and N-pole.
ADVANTAGE - Such **spiral** curve is formed so as to adjust each radius distance (ri), between the disc's rotating centre and each curves point, corresp. with the disc's rotation angle. Thereby, the prod of **plasma**'s passing time, i.e. such angle, and the etching rate is kept constant. Therefore, all wafers are treated uniformly.
0/8
FS CPI EPI
FA AB
MC CPI: L04-D04; M14-A02
EPI: U11-C07A1; U11-C09C

L136 ANSWER 25 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1986-227125 [35] WPIX
DNN N1986-169482 DNC C1986-097850
TI **Plasma** welding and cutting **equipment** - with a delay circuit to prolong gas flow and **cool** torch nozzle.
DC M23 P55 X14 X24
IN MARHIC, G
PA (AIRL) AIR LIQUIDE SA; (AIRL) AIR LIQUIDE; (AIRL) OXIGENIO BRASIL SA; (ARCO) SOUDURE AUTOGENE FRANCAISE
CYC 22
PI EP 192573 A 19860827 (198635)* FR 23p
R: AT BE CH DE GB IT LI LU NL SE
PT 82065 A 19860814 (198639)
AU 8653783 A 19860828 (198641)
FR 2578138 A 19860829 (198641)
JP 61222678 A 19861003 (198646)
ZA 8601214 A 19860820 (198649)
BR 8600731 A 19861104 (198651)
DK 8600783 A 19860823 (198704)
ES 8705181 A 19870701 (198730)

US 4692582 A 19870908 (198738)
CA 1253578 A 19890502 (198922)
EP 192573 B 19890927 (198939) FR
R: AT BE CH DE FR GB IT LI LU NL SE
DE 3665970 G 19891102 (198945)
JP 02009917 B 19900305 (199013)
DK 169455 B 19941031 (199442) H05H001-34

ADT EP 192573 A EP 1986-400343 19860219; FR 2578138 A FR 1985-2554 19850222; JP 61222678 A JP 1986-38139 19860222; ZA 8601214 A ZA 1986-1214 19860218; ES 8705181 A ES 1986-552069 19860217; US 4692582 A US 1986-830112 19860218; DK 169455 B DK 1986-783 19860220

FDT DK 169455 B Previous Publ. DK 8600783

PRAI FR 1985-2554 19850222

REP US 3242305; US 3433927; US 4122327

IC B23K009-00; B23K010-00; H05H001-36
ICM H05H001-34
ICS B23K009-00; B23K010-00; H05H001-28; H05H001-36

AB EP 192573 A UPAB: 19930922
Equipment for **plasma** welding or cutting comprises principally a torch incorporating an electrode and a nozzle, connected to a **supply** of **plasma** generating **gas**, and a source of electric power to strike, maintain and cut off the arc. Electrode and nozzle are axially opposed, capable of making contact against an elastic return towards the normal operating position of maximum mutual separation. A delay mechanism is coupled to the **gas supply** and the power source. When the arc is cut off gas continues to flow for a predetermined interval of time to **cool** the nozzle.

USE/ADVANTAGE - The delay mechanism incorporates means of adjusting the time interval, e.g. as a function of the duration of the preceding cutting operation. Gas **control** may be by a single electrically operated value to turn the supply on and off as required by the power supply and the delay mechanism. A second dual-flow valve may be added to given maximum gas flow for striking the arc and normal operation, and a reduced flow when the arc is cut off to **cool** the nozzle.
1/5

ABEQ EP 192573 B UPAB: 19930922
A **plasma** welding or curring system, of the kind comprising a torch ignited by short-circuiting and having a fixed electrode (2) and a movable nozzle (3), means for **supplying** the torch with **gas** (.G.M.) to provide it with a high rate of flow of plasmaproducing gas, the said gas also serving to ensure the **cooling** of the torch, as well as electrical supply means (E.C.M.) for the torch for producing, maintaining or breaking an electric **plasma** welding or cutting arc, the nozzle (3) being mounted for axial displacement, up to contact with the electrode (2), against the action of elastic means for returning it towards a position of maximum mutual spacing corresponding to normal operation, characterized in that it comprises delay means (C.G.M.) connected on the one hand to the electrical supply means (E.C.M.) of the torch and on the other hand to the **gas supply** means (.G.M.) of the torch, the said delay means being responsive to the breaking of the electric arc of the torch and effecting the stopping of reduction of the said as flow after a predetermined time interval following the breaking of the electric arc, in such a way as to ensure the **cooling** of the torch during the said time interval.

ABEQ US 4692582 A UPAB: 19930922
Plasma welding or cutting torch (1) contains an electrode (2) and a nozzle (3) which can slide w.r.t. the torch body (4). A switch (34) to an auxiliary low-voltage transformer (31) initiates ignition. The arc is formed by the nozzle, electrode, and workpiece coming into mutual

contact. The auxiliary circuit feeds through the short circuit, exciting **coils** (**42**, 142) which close the main contact (15) of the power transformer (10) and the contact (86) for the **gas supply**. The gap between nozzle and electrode forms the arc between electrode and workpiece (7). On stopping the arc, the main contact (15) is opened and simultaneously a **coil** (142) is de-excited to put a relay (86) in timed state to close the **gas supply** valve (V1) in 5-15 secs.

ADVANTAGE - **Plasma gas** is only **supplied** when there is an arc, striking of an arc is not difficult, and flow of **gas** on completion maintains **nozzle**-electrode distance.

FS CPI EPI GMPI
FA AB
MC CPI: M23-D01B1
EPI: X14-F; X24-D09

L136 ANSWER 26 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1986-063412 [10] WPIX
DNC C1986-027019
TI Gas **plasma** vacuum **discharge appts**. - using dynamic magnetic fields and limited electron circulation.
DC M13
IN KIM, K; WILKINSON, O
PA (NICV) ANELVA CORP; (NICV) NICHIDEN ANELVA KK
CYC 6
PI EP 173583 A 19860305 (198610)* EN 29p
R: DE FR GB NL
JP 61086942 A 19860502 (198624)
US 4829215 A 19890509 (198922)
EP 173583 B 19901219 (199051)
R: DE FR GB NL
DE 3580953 G 19910131 (199106)
JP 03046172 B 19910715 (199132)
ADT EP 173583 A EP 1985-306186 19850830; JP 61086942 A JP 1984-207530 19841003; US 4829215 A US 1987-110622 19871020; JP 03046172 B JP 1984-207530 19841003
PRAI JP 1984-182183 19840831; JP 1984-207530 19841003
REP 2.Jnl.Ref; DE 2321665; DE 2800852; EP 45822; EP 99725; GB 2127043; JP 53141182; JP 57194256; US 4417968; US 4422916; US 4443318; US 4444643; DE 2707144; EP 173583
IC B01J019-08; C23C014-34; C23C015-00; C23C016-44; H01L021-20
AB EP 173583 A UPAB: 19930922

Discharge reaction **appts**. uses gas **plasma**, generated by vacuum **discharge**, to treat the surface of an object. It comprises a vacuum chamber, to which a given amt. of **gas** may be **introduced** at a **controlled** pressure. A **discharge** is generated in the chamber by applying electric power to an incorporated **electrode**, while a dynamic magnetic field, either rotating or alternating, is generated across its flat surface upon which the object is placed. Three **coils** or pairs of **coils**, generate the rotating field, two the alternating, set inside or outside the chamber. Means are incorporated to limit or stop circulating motion of electrons around the **electrode**.

USE/ADVANTAGE - The **appts**. may be used for film deposition, etching, cleaning, surface hardening, etc. a surface. By preventing electrons circulating the **electrode** in a pseudo-cycloid motion, they disperse producing a **plasma** with a uniform and high density near the flat surface of the **electrode**. This allows the object to be treated at high speed, with good uniformity.

0/31
ABEQ EP 173583 B UPAB: 19930922
A **discharge** reaction **apparatus** comprising a vacuum vessel incorporating at least one **electrode** therein, means for introducing a given amount of gas into the vacuum vessel, means for **controlling** the pressure in he vacuum vessel, means for generating a **discharge** in the vacuum vessel by applying electric power to the **electrode**(s) thereby to process an object in the vacuum vessel, means to limit or stop any endless circulating motion of electrons which circulate the **electrode** in an endless manner, and means for generating a dynamic magnetic field along a flat surface portion of the **electrode**, characterised in that the magnetic field lines are produced parallel to and along the flat surface portion of the **electrode**, and in that the dynamic magnetic field is a rotating magnetic field or an alternating magnetic field.
ABEQ US 4829215 A UPAB: 19930922
Discharge reaction **equipment** for film deposition, etching etc. has a vacuum chamber contg. the processed object, into which a processing **gas** is **introduced**. High frequency electric power is applied between the chamber vessel and an **electrode** on which the processed object is placed. An AC current is supplied to **coils** to produce an alternating or rotating magnetic field, parallel to the **electrode**. **Coils** may be inside or outside the vessel and may each receive one phase of a 3 phase supply. Electric field and magnetic field are per
11.1
sitypendicular to each other.
ADVANTAGE - High denSU **plasma** gas perior uniformity near and along the surface of the **electrode**, giving high quality and high speed processing.
FS CPI
FA AB
MC CPI: M13-E05

L136 ANSWER 27 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1978-07233A [04] WPIX
TI Ion plating **apparatus** - with intermediate **electrode** and thermion generating filament.
DC M13
PA (NISH-I) NISHIDA N
CYC 1
PI JP 52147579 A 19771208 (197804)*
PRAI JP 1976-64802 19760603
IC C23C013-08
AB JP 52147579 A UPAB: 19930901
An ion plating **apparatus** comprises a vacuum chamber contg. a high frequency **coil electrode** for ionizing vapour from a volatile material by high frequency **discharge** of the **gas introduced** to the vacuum chamber. An acceleration cathode for receiving the ionized vapour as a film coating, an intermediate **electrode** disposed between the high frequency **electrode** and the cathode, and a thermion generation filament disposed beside the cathode.
A positive D.C. current or non-biased A.C. current is supplied to the intermediate **electrode** to **control** the **plasma** density and to reduce ion trapping by the high frequency **electrode**. The thermion generator filament facilitates starting of **discharge** at a vacuum less than 10-4 tor and assures continuous steady **discharge** once it has started.
FS CPI

FA AB
MC CPI: M13-F

L136 ANSWER 28 OF 28 WPIX (C) 2002 THOMSON DERWENT
AN 1975-N2873W [50] WPIX
TI Arc-**discharge appts**. (**controlled**) firing - by introduction of concentrated **plasma**.
DC V05
PA (BELY-I) BELYAEV B V
CYC 1
PI SU 426261 A 19750529 (197550)*
PRAI SU 1968-1285238 19681125
IC H01J013-34
AB SU 426261 A UPAB: 19930831
Method, suitable for gas-**discharge apparatus** with liquid cathode, and having advantage of low firing voltage, comprises introduction of concentrated **plasma** into the main **discharge** gap. The **plasma** is obtained as a result of an auxiliary **discharge** between the firing **control electrodes**. The lower firing voltage and increased firing efficiency are obtained by applying external magnetic field to the electric field of auxiliary **discharge**. The **former** is perpendicular to the latter. The magnetic field forces the **plasma** into the **discharge** gap. **Apparatus** comprises mercury cathode (1), anode (2), envelope (3), hollow cylindrical cathode (4), coaxialk anode (5), solenoid **coil** (6), current pulse generator (7).
FS EPI
FA AB

=> file compendex, inspec
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=> d L152 1-8 all

L152 ANSWER 1 OF 8 COMPENDEX COPYRIGHT 2002 EEI
AN 1998(42):7990 COMPENDEX
TI Development of the pulse RAG switch.
AU Rim, Geun-Hie (Korea Electrotechnology Research Inst, Chang-won, South Korea); Cho, Chu-Hyun; Lee, Hong-Sik; Pavlov, E.P.
MT Proceedings of the 1998 IEEE International Conference on Plasma Science.
MO IEEE
ML Raleigh, NC, USA
MD 01 Jun 1998-04 Jun 1998
SO IEEE International Conference on Plasma Science 1998.IEEE, Piscataway, NJ, USA,98CH36221.p 228 4P64
CODEN: 85PSAO ISSN: 0730-9244
PY 1998

MN 48802
DT Conference Article
TC General Review
LA English
AB A rotary arc gap (RAG) switch has been designed as a pulse closing switch to discharge the 500 kJ of stored energy in a capacitor bank.It has two ring **electrodes** that are maintained axially parallel each other with gap between them joined by insulating spacing element.One of the **electrodes** has a hole for generation of **plasma** jet.Triggering of RAG switch is realized by **plasma** jet from the **plasma** gun connected to **controller** output.Both **electrodes** have cuts dislocated relatively each other.The current feedlines to **electrodes** are placed in such manner that after closing of the interelectrode gap by pulse **plasma** jet from **plasma** gun, and the arc, ignited by triggering, is forced to move along the ring **electrodes** by self-magnetic field.That is why wearing of **electrodes** is uniform on all over their surfaces and the switch has quite long lifetime.This switch operates in air atmosphere and needs no **additional** gas and **pumping** **equipment**.It ensures RAG switch trigger in wide range of voltage applied to switch (from 0.7 kV up to 11 kV).Peak current discharged through RAG switch reaches up to 400 kA.Transferred charge quantity per pulse reaches 200 Coulombs.(Author abstract)
CC 704.2 Electric Equipment; 714 Electronic Components and Tubes; 713.4 Pulse Circuits; 704.1 Electric Components; 932.3 Plasma Physics; 701.1 Electricity: Basic Concepts and Phenomena
CT *Electric switches; **Plasma** jets; Capacitors; **Plasma** guns; Electric currents; Electric discharges; Magnetic fields; Pulse circuits; **Electrodes**
ST Rotary arc gap (RAG) switches

L152 ANSWER 2 OF 8 COMPENDEX COPYRIGHT 2002 EEI
AN 1994(51):3307 COMPENDEX
TI Operation of a Fluorinert cooling system for the TFTR TF **coils** and TFTR **Coil** Flowswitch Monitoring System modification to accommodate the TF alternate cooling system (Fluorinert).
AU Barnes, G.W. (Princeton Plasma Physics Lab, Princeton, NJ, USA); Walton, G.R.; Bashore, D.
MT Proceedings of the 15th IEEE/NPSS Symposium on Fusion Engineering.
ML Hyannis, MA, USA
MD 12 Oct 1993
SO Proceedings - Symposium on Fusion Engineering v 1 1993.Publ by IEEE, IEEE Service Center, Piscataway, NJ, USA.p 329-332
CODEN: PSFEES
ISBN: 0-7803-1413-1
PY 1993
MN 20909
DT Conference Article
TC Theoretical; Experimental
LA English
AB The Tokamak Fusion Test Reactor (TFTR) at the Princeton **Plasma** Physics Laboratory (PPPL) employs Toroidal Field (TF) and Poloidal Field (PF) **coils** to generate the magnetic fields required for fusion **plasma** confinement.Several small deionized cooling water leaks in several TF **coils** had occurred and impacted TFTR operations.In order to prepare the TF **coils** for D-T experimental runs, the TF **coil**'s deionized water coolant was replaced with a dielectric fluid-Perfluoroheptane (3M Fluorinert PF-5070) in May 1993.The TF

Alternate Cooling System (Fluorinert) is now in the operational phase.This paper describes how the TF Alternate Cooling System (Fluorinert) is operationally different from its predecessor (water) and how the Water Systems Group participated in the testing of the system.Operations and the special techniques that the TF Alternate Cooling System requires for maintenance are a part of this paper.The training of the Water Systems personnel in order to effectively monitor the **controls** and **equipment** for Fluorinert cooling during Tritium operations is also addressed. This paper also describes the application of commercially available hardware and software to mitigate the consequences of a **coil** cooling flow loss.The TFTR **Coil** Flowswitch Monitoring System is devoted to **coil** protection and employs a Programmable Logic **Controller** (PLC) to monitor the cooling flow at the outlet of each **coil's** cooling path.The system inhibits field **coil** rectifier operation when failure conditions exist and employs various redundant and stuck mode features.The **Coil** Flowswitch Monitoring System was initially installed in February, 1988 and modified in May, 1993 to accommodate the **addition** of a **pump** and a split of cooling paths.This paper will also discuss the PLC's reliability and operational history.(Author abstract)

CC 621.2 Fusion Reactors; 704.1 Electric Components; 932.2.1 Fission and Fusion Reactions; 932.3 Plasma Physics; 622.1.1 Radioisotopes; 721.2 Logic Elements

CT *Tokamak devices; Computer software; Coolants; Inertial confinement fusion; **Plasma** confinement; Tritium; Logic devices; Monitoring; Electric **coils**; Cooling systems

ST Tokamak Fusion Test Reactor; Toroidal field **coils**; Programmable Logic **Controller**; Poloidal field **coils**; Fluorinert cooling system

ET F*T; TF; T cp; cp; F cp; D*T; D-T

L152 ANSWER 3 OF 8 COMPENDEX COPYRIGHT 2002 EEI

AN 1994(35):2874 COMPENDEX

TI Design of a UHV reactor for microwave **plasma** deposition of diamond films.

AU Jubber, M.G. (Heriot-Watt Univ, Edinburgh, UK); Wilson, J.I.B.; Drummond, I.C.; John, P.; Milne, D.K.

MT Proceedings of the Vacuum, Plasma and Surface Technology Conference.

ML Brighton, UK

MD 19 Apr 1993-22 Apr 1993

SO Vacuum v 45 n 5 May 1994.p 499-506
CODEN: VACUAV ISSN: 0042-207X

PY 1994

MN 20604

DT Journal

TC Application; General Review

LA English

AB A UHV compatible deposition system has been constructed for the growth of diamond films by 2.45 GHz microwave **plasma** chemical vapour deposition (CVD).The system comprises a loadlock and a spherical deposition chamber where the heated 100 mm diameter substrate is exposed to a reactive **plasma** environment.The design provides ports for in-situ monitoring by ellipsometry, optical emission spectrometry, mass spectrometry, and laser reflectometry and allows for the later addition of analysis chambers such as XPS. Computer **control** is provided for all major components and operations, including pumps, valves, gas flows, pressure and temperature adjustment.The system has four **pumping** groups, **two** for the main growth chamber providing base vacuum and for pumping the process gases, one for evacuating the loadlock and the fourth for the mass spectrometer.Microwaves enter the chamber via an

antenna-based microwave applicator with a water-cooled quartz window.A key feature of this design is the ability to have a free standing ball plasma which touches neither the chamber walls nor the substrate.(Author abstract) 20 Refs.
CC 802.1 Chemical Plants and Equipment; 633.1 Vacuum Applications; 813.1 Coating Techniques; 482.2.1 Gems; 933.1.2 Crystal Growth; 932.3 Plasma Physics
CT *Chemical reactors; **Control equipment**; Synthetic diamonds; Film growth; Substrates; **Plasma** applications; Ellipsometry; Mass spectrometry; Vacuum applications; Chemical vapor deposition
ST Ultrahigh vacuum reactor; Diamond films; Microwave **plasma** chemical vapour deposition

L152 ANSWER 4 OF 8 COMPENDEX COPYRIGHT 2002 EEI
AN 1975(6):1851 COMPENDEX DN 750640360
TI FREE RADICALS RESULTING FROM **PLASMA** POLYMERIZATION AND **PLASMA** TREATMENT.
AU Morosoff, N. (Res Triangle Inst, Research Triangle Park, NC); Crist, B.; Bumgarner, M.; Hsu, T.; Yasuda, H.
SO Am Chem Soc Div Polym Chem Prepr v 16 n 1 1975, for Meet, Philadelphia, Pa, Apr 6-11 1975, p 38-41
CODEN: ACPPAY
LA English
AB Free radicals formed in **plasma**-treated substrates and in samples coated by means of **plasma** polymerization have been studied by means of ESR spectrometry. This has provided results on the rate of radical formation and its dependence on the physical and chemical variables of **plasma** formation, on the location of the radicals in the sample, on the mechanism of radical formation and on possible methods of accelerating free-radical decay. Samples were treated in an electrodeless glow discharge formed in an **apparatus** described by Yasuda and Lamaze. A gas (or combination of **gases**) is continuously **introduced**, at low pressure, into a glass tube being evacuated by a **pump**; the glow **discharge** is induced by a R.F. discharge **coil** wrapped around a section of the tube, and the sample, to be subsequently examined in the EPR spectrometer, is placed downstream from the discharge **coil**. Gases used in this study include nitrogen and several other gases and their mixtures. The results of a detailed investigation of the rate of production of radicals in the nitrogen gas, glass substrate system are shown in curves. Results of the study are summarized.
CC 801 Chemical Analysis & Physical Chemistry; 804 Chemical Products; 815 Plastics & Polymeric Materials; 931 Applied Physics; 932 High Energy, Nuclear & Plasma Physics
CT *POLYMERIZATION; **PLASMAS**; MAGNETIC RESONANCE; NITROGEN; SPECTROSCOPIC ANALYSIS
ST FREE RADICALS

L152 ANSWER 5 OF 8 INSPEC COPYRIGHT 2002 IEE
AN 1998:6033007 INSPEC DN A9821-5275-010; B9811-2315-001
TI Development of the pulse RAG switch.
AU Geun-Hie Rim; Chu-Hyun Cho; Hong-Sik Lee (Korea Electrotechnol. Res. Inst., Changwon, South Korea); Pavlov, E.P.
SO 25th Anniversary, IEEE Conference Record - Abstracts. 1998 IEEE International Conference on Plasma Science (Cat. No.98CH36221) New York, NY, USA: IEEE, 1998. p.228 of 343 pp. 0 refs.
Conference: Raleigh, NC, USA, 1-4 June 1998
Sponsor(s): Plasma Sci. & Applications Committee of the IEEE Nucl. & Plasma Sci. Soc

ISBN: 0-7803-4792-7
DT Conference Article
TC Theoretical
CY United States
LA English
AB Summary form only given. A rotary arc gap (RAG) switch has been designed as a pulse closing switch to discharge the 500 kJ of stored energy in a capacitor bank. It has two ring **electrodes** that are maintained axially parallel each other with gap between them joined by insulating spacing element. One of the **electrodes** has a hole for generation of **plasma** jet. Triggering of RAG switch is realized by **plasma** jet from the **plasma** gun connected to **controller** output. Both **electrodes** have cuts dislocated relatively each other. The current feedlines to **electrodes** are placed in such manner that after closing of the interelectrode gap by pulse **plasma** jet from **plasma** gun, and the arc, ignited by triggering, is forced to move along the ring **electrodes** by self-magnetic field. That is why wearing of **electrodes** is uniform on all over their surfaces and the switch has quite long lifetime. This switch operates in air atmosphere and needs no **additional** gas and **pumping equipment**. It ensures RAG switch trigger in wide range of voltage applied to switch (from 0.7k V up to 11 kV). Peak current discharged through RAG switch reaches up to 400 kA. Transferred charge quantity per pulse reaches 200 Coulombs.
CC A5275K Plasma switches; A5280M Arcs and sparks; B2315 Gas discharges; B2180B Relays and switches; B2810E Gaseous insulation, breakdown and discharges; B8370 Switchgear
CT ARCS (ELECTRIC); CIRCUIT-BREAKING ARCS; **PLASMA** SWITCHES
ST pulse RAG switch; pulse closing switch; discharge; stored energy; capacitor bank; **ring electrodes**; insulating spacing element; **plasma jet generation; plasma gun**; transferred charge; **electrodes**; current feedlines; interelectrode gap; **pulse plasma jet**; arc ignition; self-magnetic field; lifetime; air atmosphere; peak current
ET V

L152 ANSWER 6 OF 8 INSPEC COPYRIGHT 2002 IEE
AN 1995:5058525 INSPEC DN A9520-2852-093; C9511-3340F-008
TI Operation of a Fluorinert cooling system for the TFTR TF **coils** and TFTR **Coil** Flowswitch Monitoring System modification to accommodate the TF Alternate Cooling System (Fluorinert).
AU Barnes, G.W.; Walton, G.R.; Bashore, D. (Plasma Phys. Lab., Princeton Univ., NJ, USA)
SO 15th IEEE/NPSS Symposium. Fusion Engineering (Cat. No.93CH3348-0) New York, NY, USA: IEEE, 1994. p.329-32 vol.1 of 2 vol. 1213 pp. 0 refs.
Conference: Hyannis, MA, USA, 11-15 Oct 1993
Sponsor(s): IEEE Nucl. & Plasma Sci. Soc.; ANS; US DOE, Office of Fusion Energy; MIT Plasma Fusion Center; Princeton Plasma Phys. Lab.; EBASCO Serv.; General Atomics; IGC Adv. Superconductors; McDonnell Douglas; Teledyne Wah Chang Albany; Rockwell Int. Rocketdyne Div.; Stone & Webster Eng. Corp
Price: CCCC 0 7803 1412 3/94/$04.00
ISBN: 0-7803-1412-3
DT Conference Article
TC Practical
CY United States
LA English
AB The Tokamak Fusion Test Reactor (TFTR) at the Princeton **Plasma** Physics Laboratory (PPPL) employs Toroidal Field (TF) and Poloidal Field (PF) **coils** to generate the magnetic fields required for fusion

plasma confinement. Several small deionized cooling water leaks in several TF **coils** had occurred and impacted TFTR operations. In order to prepare the TF **coils** for D-T experimental runs, the TF **coil**'s deionized water coolant was replaced with a dielectric fluid-perfluoroheptane (3M Fluorinert PF-5070) in May 1993. The TF Alternate Cooling System (Fluorinert) is now in the operational phase. This paper describes how the TF Alternate Cooling System (Fluorinert) is operationally different from its predecessor (water) and how the Water Systems Group participated in the testing of the system. Operations and the special techniques that the TF Alternate Cooling System requires for maintenance are a part of this paper. The training of the Water Systems personnel in order to effectively monitor the **controls** and **equipment** for Fluorinert cooling during tritium operations is also addressed. This paper also describes the application of commercially available hardware and software to mitigate the consequences of a **coil** cooling flow loss. The TFTR **Coil** Flowswitch Monitoring System is devoted to **coil** protection and employs a programmable logic **controller** (PLC) to monitor the cooling flow at the outlet of each **coil**'s cooling path. The system inhibits field **coil** rectifier operation when failure conditions exist and employs various redundant and stuck mode features. The **Coil** Flowswitch Monitoring System was initially installed in February, 1988 and modified in May, 1993 to accommodate the **addition** of a **pump** and a split of cooling paths. This paper will also discuss the PLC's reliability and operational history.

CC A2852J Fusion reactor theory and design; A0720 Thermal instruments and techniques; A0150 Educational aids; A2852N Fusion reactor safety; C3340F Control of nuclear systems; C7470 Nuclear engineering computing; C3220B Programmable controllers

CT **COILS**; COOLING; FUSION REACTOR DESIGN; FUSION REACTOR SAFETY; FUSION REACTORS; NUCLEAR ENGINEERING COMPUTING; NUCLEAR REACTOR MAINTENANCE; PERSONNEL; PROGRAMMABLE **CONTROLLERS**; TOKAMAK DEVICES; TRAINING

ST TFTR; **toroidal field coils**; Fluorinert cooling system; **Coil Flowswitch Monitoring System**; Alternate Cooling System; Tokamak Fusion Test Reactor; perfluoroheptane; training; deionized water; Water Systems personnel; **coil cooling flow loss**; **programmable logic controller**; **coil rectifier**; H2O

CHI H2O bin, H2 bin, H bin, O bin

ET F*T; TF; T cp; cp; F cp; D*T; D-T; H*O; H2O; H cp; O cp; H; O

L152 ANSWER 7 OF 8 INSPEC COPYRIGHT 2002 IEE

AN 1970:105966 INSPEC DN A70017202

TI **Plasma** heating **apparatus** for titania production.

CS British Titan Products Co. Ltd

PI UK 1164396 17 Sept. 1969

AD 13 June 1968

PRAI UK 31826/67

DT Patent

CY United Kingdom

LA English

AB Describes a **plasma** heating **apparatus** particularly for producing titanium dioxide from mineral rutile. It may have the gas confining tube at an angle, and the powder introduction tube may be at an angle to the **gas** tube. By **introducing** the powder at the lower end of the **plasma** 'ball', build up of powder within the tube is reduced. For titanium production, a rutilising agent may be introduced into the **plasma**. Additionally, alternative positions for the gas tube and feed tube are given, also r.f. values and number of turns for the heating **coil**, also powder particle sizes, also

various **gases** for **introduction** into the **plasma**
. The feed tube and heating **coil** may be **cooled.**
CC A8140G Other heat and thermomechanical treatments
CT HEAT TREATMENT; METALLURGY; **PLASMA** DEVICES; TITANIUM COMPOUNDS

L152 ANSWER 8 OF 8 INSPEC COPYRIGHT 2002 IEE
AN 1969:20872 INSPEC DN A69014296
TI Characteristics of an ultra-high vacuum chamber.
AU Tominaga, G.; Hirao, K.; Ito, T.; Hayashi, C.
SO Le Vide (Nov. 1967) vol.22, no.132, p.355-60
CODEN: VIDEAA
DT Journal
CY France
LA French
AB The chamber 2000 mm dia*3000 mm length is designed for simulation of **plasma** in outer space. Made of non-magnetic materials with necessary processing technique, the chamber is highly non-magnetic. A pair of Helmholtz-**coils** is equipped to produce a homogeneous field in the space for experiment. **Two** 36" oil diffusion **pumps** a titanium sublimation pump and a small sputter-ion pump are provided with a specially designed 54 inch UHV valve.
CC A0730 Vacuum production and techniques
CT VACUUM **APPARATUS**

=> d L153 1-14 all

L153 ANSWER 1 OF 14 COMPENDEX COPYRIGHT 2002 EEI
AN 2001(34):3685 COMPENDEX
TI Modified GSMBE for higher growth rate and non-selective growth.
AU Woods, N.J. (Department of Physics Centre for Electronic Mat./Devices Imp. College of Sci., Technol./Med., London SW7 2B2, United Kingdom); Breton, G.; Graoui, H.; Zhang, J.
MT 11th International Conference on Molecular Beam Epitaxy.
ML Bijing, China
MD 11 Sep 2000-15 Sep 2000
SO Journal of Crystal Growth v 227-228 July 2001 2001.p 735-739
CODEN: JCRGAE ISSN: 0022-0248
PY 2001
MN 58293
DT Conference Article
TC Experimental
LA English
AB Gas source molecular beam epitaxy (GSMBE) is a versatile **tool** for epitaxial growth of Si and SiGe from hydride precursors offering **control** on the atomic level, low thermal budget, a host of in-situ surface diagnostic **tools**, and possibility of selective epitaxial growth (SEG). However, the technique suffers from a much smaller growth rate in comparison to chemical vapour deposition (CVD) or solid source MBE. Where a process requires non-selective epitaxial growth (NSEG), the large contrast between growth rates over silicon and SiO2 surfaces make it impractical. These deficiencies are overcome by **addition** of a **pumping** system with managed throughput thus allowing the system to be operated in a new ultra low pressure CVD (**ULPCVD**) mode as well as the conventional GSMBE mode. The modified system can achieve growth rate in excess of 0.5 mum/h and full NSEG in the **ULPCVD** mode while maintaining all the capability and advantages of GSMBE mode. The materials and structures are characterised and are shown to be better in many respects compared with those grown under conventional GSMBE. $CPY 2001 Elsevier Science B.V. 11 Refs.

CC 712.1 Semiconducting Materials; 712.1.1 Single Element Semiconducting Materials; 712.1.2 Compound Semiconducting Materials; 931.3 Atomic and Molecular Physics; 933.1.2 Crystal Growth; 802.2 Chemical Reactions
CT *Semiconductor growth; Semiconducting silicon compounds; Semiconducting silicon; Heterojunctions; Molecular beam epitaxy; Chemical vapor deposition
ST Gas source molecular beam epitaxy (GSMBE); Ultra low pressure chemical vapor deposition (**ULPCVD**); Selective epitaxial growth (SEG)
ET Si; Ge*Si; Ge sy 2; sy 2; Si sy 2; SiGe; Si cp; cp; Ge cp; O*Si; SiO; O cp

L153 ANSWER 2 OF 14 COMPENDEX COPYRIGHT 2002 EEI
AN 1995(15):6841 COMPENDEX
TI Two phase liquid helium flow testing to simulate the operation of a cryocondensation pump in the DIII-D tokamak.
AU Laughon, G.J. (General Atomics, San Diego, CA, USA); Baxi, C.B.; Campbell, G.L.; Mahdavi, M.A.; Makariou, C.C.; Menon, M.M.; Smith, J.P.; Schaffer, M.J.; Schaubel, K.M.
MT Proceedings of the 15th International Cryogenic Engineering Conference.
ML Genova, Italy
MD 07 Jun 1994-10 Jun 1994
SO Cryogenics v 34 n Suppl 1994.p 365-368
CODEN: CRYOAX ISSN: 0011-2275
PY 1994
MN 42437
DT Journal
TC General Review; Experimental
LA English
AB A liquid helium-cooled cryocondensation pump has been installed in the DIII-D tokamak fusion energy research experiment at General Atomics.The pump is located within the tokamak vacuum chamber beneath the divertor baffle plates and is utilized for **plasma** density and contamination **control**.Two-phase helium flows through the pump at 5 to 10 g/s utilizing the heat transfer and constant temperature characteristics of boiling liquid helium.The pump is designed for a pumping speed of 32,000 l/s.Extensive testing was performed with a prototypical **pump** test fixture.**Several pump** geometries (simple tube, coaxial flow plug, and coaxial slotted insert) were tested, in an iterative process, to determine which was the most satisfactory for stable cryocondensation pumping. Results from the different tests illustrating the temperature distribution and flow characteristics for each configuration are presented.(Author abstract) 5 Refs.
CC 631.1 Fluid Flow (General); 804.2 Inorganic Components; 644.5 Cryogenic Equipment and Components; 932.3 Plasma Physics; 618.2 Pumps; 633.2 Vacuum Equipment
CT *Two phase flow; Temperature distribution; Tokamak devices; **Plasma** density; Contamination; Vacuum pumps; **Equipment** testing; Iterative methods; Helium; Cryogenic **equipment**
ST Cryocondensation pump; Tokamak vacuum chamber
ET D

L153 ANSWER 3 OF 14 COMPENDEX COPYRIGHT 2002 EEI
AN 1992(4):902 COMPENDEX DN 920451942
TI Chronic evaluation of a compact nonseal magnet pump as a nonpulsatile pump for long-term use.
AU Taenaka, Yoshiyuki (Natl Cardiovascular Cent, Osaka, Jpn); Tatsumi, Eisuke; Sakaki, Masayuki; Sasaki, Eisaku; Masuzawa, Toru; Nakatani, Takeshi; Akagi, Haruhiko; Goto, Masahiro; Matsuo, Yoshiaki; Inoue, Kazushige; Baba, Yuzo; Kinoshita, Masayuki; Takano, Hisateru
SO ASAIO Transactions (American Society for Artificial Internal Organs) v 37

n 3 Jul-Sep 1991.p M243-245
CODEN: ASATEJ ISSN: 0889-7190
PY 1991
MN 15878
DT Journal
TC Experimental
LA English
AB Use of a nonpulsatile pump is one of the most interesting approaches in the development of artificial hearts.A centrifugal pump without a seal around the rotating part was evaluated in five goats.The size of the pump is 8.4 cm multiplied by phi 7.0 cm, including an electric motor.A polypropylene impeller with four fins on the top of a column in which a magnetic ring is embedded spins by coupling with a rotating magnet outside the housing.In the goats, the pump was placed paracorporeally to provide total left heart bypass at a flow rate of 4.6-7.6 L/min, and activated clotting time was **controlled** at 200-300 sec by continuous heparin infusion.Although the first three goats died within 3 days due to bleeding, embolism, and a jammed impeller, respectively, a pump could be driven for 14 days in the fourth goat, and **another pump** with a rotational **control** feedback system ran for 32 days in the fifth goat.**Plasma** free hemoglobin levels were 13.8 plus or minus 4.3 mg/dl and 9.5 plus or minus 2.5 mg/dl, and platelet counts were 53.8 plus or minus 24.7 multiplied by 104/mm3 and 62.0 plus or minus 22.0 multiplied by 104mm3 after 12 hours and 7 days pumping, respectively.No thrombus was observed in the blood chamber in the last two cases.In conclusion, this pump has possibilities as a nonpulsatile pump for long-term use.(Author abstract) 2 Refs.
CC 462 Medical Engineering & Equipment; 461 Biotechnology; 618 Compressors & Pumps; 631 Fluid Flow & Hydrodynamics
CT *PROSTHETICS:Artificial Organs; BIOMEDICAL ENGINEERING:Surgical Implants; FLOW OF FLUIDS:Pulsatile Flow; BIOMEDICAL ENGINEERING:Hemodynamics; BIOMEDICAL **EQUIPMENT**:Pumps
ST ARTIFICIAL HEART; NONSEAL MAGNET PUMPS; NONPULSATILE PUMPS

L153 ANSWER 4 OF 14 COMPENDEX COPYRIGHT 2002 EEI
AN 1987(5):80560 COMPENDEX
TI MULTICHANNEL SUBMILLIMETER WAVE INTERFEROMETER OF THE TOKAMAK DE VARENNES.
AU Lachambre, J.L. (Inst de Recherche d'Hydro-Quebec, Varennes, Que, Can)
MT Far-Infrared Science and Technology.
MO SPIE, Bellingham, WA, USA; Natl Research Council Canada, Ottawa, Ont, Can; Univ Laval, Ste.-Foy, Que, Can; Defence Research Establishment, Valcartier, Que, Can
ML Quebec City, Que, Can
MD 05 Jun 1986-06 Jun 1986
SO Proceedings of SPIE - The International Society for Optical Engineering v 666.Publ by SPIE, Bellingham, WA, USA p 179-192
CODEN: PSISDG ISSN: 0277-786X
ISBN: 0-89252-701-3
PY 1986
MN 09496
DT Conference Article
LA English
AB We have developed a six-beam submillimeter wave interferometer at 214 mu m to be installed on the Varennes tokamak for **plasma** shape and density fluctuation measurements (ne approximately 3 multiplied by 1019 m minus 3, Te approximately 450 eV).The number of chords and their distribution in the **plasma** cross-section are chosen for optimum density profile reconstruction through Abel inversion.Each channel consists of a frequency-modulated Mach-Zehnder **interferometer** derived from the same dual-beam submillimeter source.This source is an optically

pumped twin CH2F2 laser featuring three stabilizing
feedback loops: Stark-cell tuning of the pump CO2 laser, beat frequency
control of the two output carriers and power locking of the
submillimeter wave cavities.At a total pump power of 22 W, each laser
delivers 25 mW of radiation at 214 mu m.The extension of the present
interferometer to polarimetry is discussed.(Edited author abstract) 12
refs.

CC 621 Nuclear Reactors; 932 High Energy, Nuclear & Plasma Physics; 941 Acoustical & Optical Measuring Instruments; 933 Solid State Physics
CT *TOKAMAK DEVICES:**Instruments**; BAND STRUCTURE; INTERFEROMETERS; PHASE MODULATION
ST MULTICHANNEL SUBMILLIMETER WAVE INTERFEROMETER; TOKAMAK DE VARENNES; DENSITY RESOLUTION; **PLASMA** INTERFEROMETRY
ET C*H*F; CH2F2; C cp; cp; H cp; F cp; C*O; CO2; O cp

L153 ANSWER 5 OF 14 COMPENDEX COPYRIGHT 2002 EEI
AN 1983(1):2587 COMPENDEX DN 83013403; *8347272
TI VACUUM PROBLEMS IN TODAY'S INTEGRATED CIRCUIT MANUFACTURING SYSTEMS - 2.
AU Duval, Pierre (Co Ind des Telecommun, Annecy, Fr)
SO Solid State Technol v 25 n 9 Sep 1982 p 124-130
CODEN: SSTEAP ISSN: 0038-111X
PY 1982
LA English
AB Semiconductor manufacturing trends have initiated industrial-scale processes (LPCVD, **plasma** deposition, and **plasma** etching) employing dusty, corrosive or dangerous gases.Creating a vacuum in these left double quote dirty right double quote systems presents new problems for the designer.New safety rules have to be introduced, and these have a strong impact on the development of vacuum **pumps** and **auxiliary equipment**.These new challenges are examined, emphasizing the need for good tightness and elimination, under high-corrosion conditions, of solid particles generated either in the process itself or by secondary reactions in the vacuum pump.Selection criteria for vacuum pump lubricating oils and means of neutralizing the corrosive byproducts polluting the oil are also discussed.It is pointed out that the engineering of vacuum pumping systems needs to be simplified to improve reliability of pumping speed **control**.34 refs.
CC 713 Electronic Circuits; 714 Electronic Components
CT *INTEGRATED CIRCUIT MANUFACTURE
ET S

L153 ANSWER 6 OF 14 COMPENDEX COPYRIGHT 2002 EEI
AN 1980(11):1275 COMPENDEX DN 801180526
TI MODIFIED HOSPITAL PUMPS FOR PULSED INSULIN DELIVERY.
AU Spencer, W.J. (Sandia Lab, Livermore, Calif); Corbett, W.T.; Schade, D.S.; Eaton, R.P.; Shafer, B.D.
SO Med Prog Technol v 7 n 1 1980 p 45-55
CODEN: MDPTBG ISSN: 0047-6552
PY 1980
LA English
AB **Two** standard hospital **pumps** have been modified to provide bimodal insulin delivery for use as"open loop"artificial beta cells. The units have been designed to deliver **both** a low infusion basal rate of insulin for glycemic **control** during a fasting state in diabetics and a high infusion rate in response to a meal challenge. The basal rate can be varied in steps of 0.2 milliliter per hour from roughly one to three milliliters per hour. The higher infusion rate can be 10 to 20 times the basal rate in steps of two milliliters per hour with an automatic return to the basal rate after a 1- to 99-minute programmable interval. The burst rate is initiated manually at the start of a meal.

Displays and monitors are available to indicate the basal and high delivery rates and times. The units have been used for intravenous and intraperitoneal insulin delivery in animals and diabetic patients. There is an improvement in glycemic **control** and normalization of **plasma**-free insulin levels in juvenile-onset diabetics treated with this pulsed mode of insulin delivery. The variation in pumping rates provides flexibility in treatment of a variety of glycemic challenges. 23 refs.

CC 462 Medical Engineering & Equipment; 618 Compressors & Pumps; 461 Biotechnology

CT *BIOMEDICAL **EQUIPMENT**:Pumps; BIOMEDICAL ENGINEERING:Patient Treatment; HOSPITALS:**Equipment**

ST INSULIN INFUSION; DRUG DELIVERY SYSTEMS; INFUSION PUMPS

L153 ANSWER 7 OF 14 COMPENDEX COPYRIGHT 2002 EEI

AN 1975(10):6343 COMPENDEX DN 751068076

TI VACUUM PROBLEMS IN **PLASMA** PHYSICS AND **CONTROLLED** NUCLEAR FUSION.

AU Prevot, F. (Assocc Euratom-CEA sur la fusion, Fontenay-aux-Roses, Fr)

SO Int Vac Congr, 6th, Proc, Kyoto, Jpn, Mar 25-29 1974 p 225-231. Publ by Jpn J Appl Phys (Suppl 2 pt 1, 1974), Tokyo, 1974

PY 1974

LA English

AB **Plasma** physics and nuclear fusion reactors are shown to pose difficult vacuum problems, but these problems can probably be solved provided that the **plasma** physics do not produce appreciably more severe conditions than those envisaged today. Based on experimental data obtained, several solutions are proposed concerning the choice of the reactor wall material, baking and surface processing, **pumping** and **auxiliary equipments**, magnetic divertor, and protective layer of cold **plasma**. Examples of typical cases are presented and discussed.22 refs.

CC 621 Nuclear Reactors; 633 Vacuum Technology

CT *NUCLEAR REACTORS:Fusion; VACUUM TECHNOLOGY

L153 ANSWER 8 OF 14 INSPEC COPYRIGHT 2002 IEE

AN 2002:7377816 INSPEC DN A2002-20-8160B-150; B2002-10-7520E-024

TI Surface improvements of industrial components treated by **plasma** immersion ion implantation (PIII): results and prospects.

AU Ueda, M.; Berni, L.A.; Castro, R.M. (Laboratorio Associado de Plasma-LAP, Instituto Nacional de Pesquisas Espaciais-INPE, Sao Paulo, Brazil); Beloto, A.F.; Abramof, E.; Rossi, J.O.; Barroso, J.J.; Lepienski, C.M.

SO Surface & Coatings Technology (1 July 2002) vol.156, no.1-3, p.71-6. 10 refs.
Doc. No.: S0257-8972(02)00115-9
Published by: Elsevier
Price: CCCC 0257-8972/02/$22.00
CODEN: SCTEEJ ISSN: 0257-8972
SICI: 0257-8972(20020701)156:1/3L.71:SIIC;1-T
Conference: Sixth International Workshop on Plasma-Based Ion Implantation (PBII-2001). Grenoble, France, 25-28 June 2001

DT Conference Article; Journal

TC Experimental

CY Switzerland

LA English

AB The major drive for PIII research in recent years has been the widespread use of **plasma**-based ion implantation in industries aiming at attaining high value-added components. After achieving the domain of the complete basic PIII cycle, we started to pursue the implementation of this process in various types of industrial components. A DC glow discharge

source with a **controlled plasma** floating potential was used in a 100-1 PIII system driven by a 30-kV peak voltage, 50 mu s duration, up to 1.1 kHz pulse power source, in order to process the components which were provided by regional companies, spanning from machinery **tools** to prosthesis. The industrial components were set-up in the PIII chamber as received from the companies, after a simple cleaning procedure. In this phase, only nitrogen implantation was performed. The required processing times were typically from 60 to 120 min and the components were treated either individually or in batches. Fast steel drill bits, knife blades for wood cutting, **tools** for odontological applications, molds made of fast steel, a prosthesis made of Ti alloy, etc., have been three-dimensionally implanted successfully. Next, improvements in the PIII ongoing system included: a 10-kW pulser with up to 60 kV capability, turbo-**pump**, refrig**era**ted walls, **auxiliary** heating of the components, a larger chamber and a magnetron sputtering source for hybrid treatments.

CC A8160B Surface treatment and degradation of metals and alloys; A8770J Prosthetics and other practical applications; A5275R Plasma applications in manufacturing and materials processing; A8115J Ion plating and other vapour deposition; A6170T Doping and implantation of impurities; A6820 Solid surface structure; A6220M Fatigue, brittleness, fracture, and cracks; A8140N Fatigue, embrittlement, and fracture; A7920F Electron-surface impact: Auger emission; B7520E Prosthetics and orthotics

CT ALUMINIUM ALLOYS; AUGER ELECTRON SPECTRA; BIOMEDICAL MATERIALS; HARDNESS; ION IMPLANTATION; **PLASMA** DEPOSITION; PROSTHETICS; SURFACE COMPOSITION; SURFACE HARDENING; TITANIUM ALLOYS; **TOOL** STEEL; VANADIUM ALLOYS

ST industrial components; **plasma immersion ion implantation**; high value-added components; direct current glow discharge source; **controlled plasma floating potential**; regional companies; **machinery tools**; prosthesis; simple cleaning procedure; N implantation; fast steel drill bits; knife blades; wood cutting; odontological applications; molds; turbo-pump; refrigerated walls; auxiliary heating; chamber; magnetron sputtering source; hybrid treatments; Ti-Al-V alloy; 50 mus; 30 kV; 10 kW; 1.1 kHz; 60 to 120 min; Ti-Al-V:N

CHI TiAlV:N sur, TiAlV sur, Al sur, Ti sur, N sur, V sur, TiAlV:N ss, TiAlV ss, Al ss, Ti ss, N ss, V ss, N el, N dop; Fe sur, C sur, N sur, Fe ss, C ss, N ss, N el, N dop

PHP time 5.0E-05 s; voltage 3.0E+04 V; power 1.0E+04 W; frequency 1.1E+03 Hz; time 3.6E+03 to 7.2E+03 s

ET Ti; N; Al*Ti*V; Al sy 3; sy 3; Ti sy 3; V sy 3; Ti-Al-V; Al*N*Ti*V; Al sy 4; sy 4; N sy 4; Ti sy 4; V sy 4; N doping; doped materials; Ti-Al-V:N; TiAlV:N; Ti cp; cp; Al cp; V cp; TiAlV; Al; V; Fe; C

L153 ANSWER 9 OF 14 INSPEC COPYRIGHT 2002 IEE
AN 2001:7020981 INSPEC DN A2001-19-8115G-066; B2001-10-0520D-083
TI Modified GSMBE for higher growth rate and non-selective growth.
AU Woods, N.J.; Breton, G. (Dept. of Phys., Imperial Coll. of Sci., Technol. & Med., London, UK); Graoui, H.; Zhang, J.
SO Journal of Crystal Growth (July 2001) vol.227-228, p.735-9. 11 refs.
Doc. No.: S0022-0248(01)00817-X
Published by: Elsevier
Price: CCCC 0022-0248/2001/$20.00
CODEN: JCRGAE ISSN: 0022-0248
SICI: 0022-0248(200107)227/228L.735:MGHG;1-C
Conference: Molecular Beam Epitaxy 2000. Eleventh International Conference on Molecular Beam Epitaxy. Beijing, China, 11-15 Sept 2000
DT Conference Article; Journal
TC Experimental

CY Netherlands
LA English
AB Gas source molecular beam epitaxy (GSMBE) is a versatile **tool** for epitaxial growth of Si and SiGe from hydride precursors offering **control** on the atomic level, low thermal budget, a host of in-situ surface diagnostic **tools** and the possibility of selective epitaxial growth (SEG). However, the technique suffers from a much smaller growth rate in comparison to chemical vapour deposition (CVD) or solid source MBE. Where a process requires non-selective epitaxial growth (NSEG), the large contrast between growth rates over silicon and SiO2 surfaces make it impractical. These deficiencies are overcome by **addition** of a **pumping** system with managed throughput thus allowing the system to be operated in a new ultra low pressure CVD (**ULPCVD**) mode as well as the conventional GSMBE mode. The modified system can achieve growth rates in excess of 0.5 mu m/h and full NSEG in the **ULPCVD** mode while maintaining all the capability and advantages of GSMBE mode. The materials and structures are characterised and are shown to be better in many respects compared with those grown under conventional GSMBE.
CC A8115G Vacuum deposition; A6855 Thin film growth, structure, and epitaxy; A6820 Solid surface structure; B0520D Vacuum deposition; B2560J Bipolar transistors; B2560R Insulated gate field effect transistors
CT ATOMIC FORCE MICROSCOPY; CHEMICAL BEAM EPITAXIAL GROWTH; ELEMENTAL SEMICONDUCTORS; GE-SI ALLOYS; HETEROJUNCTION BIPOLAR TRANSISTORS; MOSFET; SEMICONDUCTOR GROWTH; SEMICONDUCTOR THIN FILMS; SILICON; SURFACE TOPOGRAPHY
ST modified GSMBE; growth rate; gas source molecular beam epitaxy; **atomic level control**; low thermal budget; nonselective epitaxial growth; NSEG; pumping system; ultra low pressure CVD; **ULPCVD mode** ; Si; SiO2; SiGe
CHI Si sur, Si el; SiO2 sur, O2 sur, Si sur, O sur, SiO2 bin, O2 bin, Si bin, O bin; SiGe sur, Ge sur, Si sur, SiGe bin, Ge bin, Si bin
ET Si; Ge*Si; Ge sy 2; sy 2; Si sy 2; SiGe; Si cp; cp; Ge cp; O*Si; SiO2; O cp; Ge-Si; SiO; O; Ge

L153 ANSWER 10 OF 14 INSPEC COPYRIGHT 2002 IEE
AN 1985:2414754 INSPEC DN A85038076; B85018005
TI Laser diagnostics of laser preionization triggered spark columns for high power switch applications.
AU Crawford, E.A.; Kimura, W.; Kushner, M.K.; Byron, S.R. (Math. Sci. Northwest Inc., Bellevue, WA, USA)
SO Conference Record of the 1984 IEEE International Conference on Plasma Science (papers in summary form only received) (Cat. No. 84CH1958-8) New York, NY, USA: IEEE, 1984. p.18 of xxii+130 pp. 2 refs. Conference: St. Louis, MO, USA, 14-16 May 1984 Sponsor(s): IEEE; McDonnel Douglas Corp.; Univ. Missouri
DT Conference Article
TC Experimental
CY United States
LA English
AB The authors discuss an experiment in a well **controlled** and characterised electrical environment, in which spark columns are initiated using an ultraviolet (UV) preionization technique. The subsequent spatio-temporal development of the spark channel is studied using an interferometer illuminated by a dye laser **pumped** with **another** UV laser. Dye laser wavelengths ranging from 352 nm to 616 nm have been used. The resulting interference patterns are analyzed to determine the radial profiles of electron density and gas density in the spark column. The authors summarize the characteristics of the experiment and the optical diagnostics. They present the results of preliminary

experiments using this **apparatus**.
CC A5270K Optical techniques; A5275K Plasma switches; A5280M Arcs and sparks; B2315 Gas discharges
CT **PLASMA** DIAGNOSTICS BY LASER BEAM; **PLASMA** SWITCHES; SPARK GAPS
ST UV preionisation techniques; laser preionization triggered spark columns; high power switch applications; spark columns; spatio-temporal development; interference patterns; radial profiles; electron density; gas density; optical diagnostics

L153 ANSWER 11 OF 14 INSPEC COPYRIGHT 2002 IEE
AN 1983:2049047 INSPEC DN B83030155
TI Vacuum problems in today's integrated circuit manufacturing systems. II.
AU Duval, P. (Vacuum Products Div., CIT-Alcatel, Annecy, France)
SO Solid State Technology (Sept. 1982) vol.25, no.9, p.124-30. 19 refs.
CODEN: SSTEAP ISSN: 0038-111X
DT Journal
TC General Review
CY United States
LA English
AB For pt.I see ibid., vol.25, no.8, p.110-16 (1982). Semiconductor manufacturing trends have initiated industrial-scale processes (LPCVD, **plasma** deposition, and **plasma** etching) employing dusty, corrosive or dangerous gases. Creating a vacuum of these 'dirty' systems presents new problems for the designer. New safety rules have to be introduced, and these have a strong impact on the development of vacuum **pumps** and **auxiliary equipment**. These new challenges are examined, emphasizing the need for good tightness and elimination, under high-corrosion conditions, of solid particles generated either in the process itself or by secondary reactions in the vacuum pump. Selection criteria for vacuum pump lubricating oils and means of neutralizing the corrosive byproducts polluting the oil are also discussed. It is pointed out that the engineering of vacuum pumping systems needs to be simplified to improve reliability of pumping speed **control**.
CC B2570 Semiconductor integrated circuits
CT CORROSION PROTECTION; INTEGRATED CIRCUIT TECHNOLOGY; VACUUM TECHNIQUES
ST vacuum techniques; IC technology; lubricating oil selection criteria; corrosive byproducts neutralisation; oil pollution; **pumping speed control reliability**; semiconductor; integrated circuit manufacturing systems; vacuum pumps; high-corrosion conditions

L153 ANSWER 12 OF 14 INSPEC COPYRIGHT 2002 IEE
AN 1983:2047852 INSPEC DN B83028901
TI Vacuum problems in today's integrated circuit manufacturing systems. I.
AU Duval, P. (CIT-Alcatel Vacuum Products Div., Annecy, France)
SO Solid State Technology (Aug. 1982) vol.25, no.8, p.110-16. 15 refs.
CODEN: SSTEAP ISSN: 0038-111X
DT Journal
TC Application; Practical; Experimental
CY United States
LA English
AB Semiconductor manufacturing trends have initiated industrial-scale processes (LPCVD, **plasma** deposition, and **plasma** etching) employing dusty, corrosive or dangerous gases. Creating a vacuum in these 'dirty' systems presents new problems for the designer. New safety rules have to be introduced, and these have a strong impact on the development of vacuum **pumps** and **auxiliary equipment**. These new challenges are examined, emphasizing the need for good tightness and elimination, under high-corrosion conditions of

solid particles generated either in the process itself or by secondary reactions in the vacuum pump. Selection criteria for vacuum pump lubricating oils and means of neutralizing the corrosive byproducts polluting the oil are also discussed. It is pointed out that the engineering of vacuum pumping systems needs to be simplified to improve reliability of pumping speed **control**.

CC B0170E Production facilities and engineering; B0520F Vapour deposition; B2550 Semiconductor device technology; B2570 Semiconductor integrated circuits

CT CHEMICAL VAPOUR DEPOSITION; INTEGRATED CIRCUIT MANUFACTURE; SEMICONDUCTOR TECHNOLOGY; SPUTTER ETCHING; VACUUM **APPARATUS**; VACUUM TECHNIQUES

ST vacuum system problems; IC manufacture; dirty systems; solid particles elimination; oil selection; industrial-scale processes; safety rules; vacuum pumps; **auxiliary equipment**; high-corrosion conditions; secondary reactions; vacuum pump lubricating oils; reliability; **pumping speed control**

ET I

L153 ANSWER 13 OF 14 INSPEC COPYRIGHT 2002 IEE

AN 1980:1589482 INSPEC DN A80101290

TI Modified hospital pumps for pulsed insulin delivery.

AU Spencer, W.J.; Corbett, W.T.; Schade, D.S.; Eaton, R.P.; Shafer, B.D. (Sandia Labs., Livermore, CA, USA)

SO Medical Progress Technology (1980) vol.7, no.1, p.45-55. 23 refs.
CODEN: MDPTBG ISSN: 0047-6552

DT Journal

TC Practical

CY Germany, Federal Republic of

LA English

AB **Two** standard hospital **pumps** have been modified **to** provide bimodal insulin delivery for use as 'open loop' artificial beta cells. The units have been designed to deliver both a low infusion basal rate of insulin for glycemic **control** during a fasting state in diabetics and a high infusion rate in response to a meal challenge. The basal rate can be varied in steps of 0.2 milliliter per hour from roughly one to three millilitres per hour. The higher infusion rate can be 10 to 20 times the basal rate in steps of two milliliter per hour with an automatic return to the basal rate after a 1- to 99-minute programmable interval. The burst rate is initiated manually at the start of a meal. Displays and monitors are available to indicate the basal and high delivery rates and times. The units have been used for intravenous and intraperitoneal insulin delivery in animals and diabetic patients. There is an improvement in glycemic **control** and normalization of **plasma**-free insulin levels in juvenile-onset diabetics treated with this pulsed mode of insulin delivery. The variation in pumping rates provides flexibility in treatment of a variety of glycemic challenges.

CC A8770G Patient care and treatment

CT BIOMEDICAL **EQUIPMENT**; PUMPS

ST pulsed insulin delivery; artificial beta cells; infusion basal rate; **glycemic control**; modified hospital pumps

L153 ANSWER 14 OF 14 INSPEC COPYRIGHT 2002 IEE

AN 1975:764672 INSPEC DN A75040982

TI Vacuum problems in **plasma** physics and **controlled** nuclear fusion.

AU Prevot, F. (CEN, Fontenay-aux-Roses, France)

SO Japanese Journal of Applied Physics (1974) suppl.2, pt.1, p.225-31. 22 refs.
CODEN: JJAPA5 ISSN: 0021-4922
Conference: Proceedings of the 6th International Vacuum Congress. Kyoto,

Japan, 25-29 March 1974
Sponsor(s): Internat. Union for Vacuum Sci., Technique & Applications
DT Conference Article; Journal
TC General Review
CY Japan
LA English
AB The first important aspect is the existence of the **plasma** itself which is at the same time a large source of neutral gas and a powerful internal pump. Interaction between neutral gas and **plasma** is very different whether the **plasma** is transparent or opaque to neutral atoms or molecules. The second important aspect is the influence of the walls on **plasma** pollution by high Z atom induced emission. These two phenomena play an important role in the energy balance of both laboratory **plasmas** and future thermonuclear reactors. Concerning the vacuum system of thermonuclear reactor, the enormous size of the vessel and pumping speed requested and some safety problems inherent to tritium handling and neutron activation must be specially mentioned. Several solutions have been proposed and partially tested in present experiments: choice of the material of the wall, baking and surface processing, **pumping** and **auxiliary equipments**, magnetic divertor and protective layer of cold **plasma**.
CC A0730G Vacuum apparatus and testing methods; A2852 Fusion reactors; A5275 Plasma devices and applications
CT FUSION REACTORS; NUCLEAR FUSION; **PLASMA** CONFINEMENT; VACUUM TECHNIQUES
ST neutral molecules; vessel size; 3H handling; wall material; vacuum problems; **plasma physics; controlled nuclear fusion; plasma**; neutral gas; internal pump; neutral atoms; **plasma pollution by high Z atom induced emission**; thermonuclear reactors; pumping speed; safety problems; neutron activation; baking; surface processing; pumping; **auxiliary equipment**; magnetic divertor; **protective layer of cold plasma**; energy balance
ET H; 3H; is; H is

=> d L164 1-16 max

L164 ANSWER 1 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 2002-425277 [45] WPIX
DNN N2002-334409 DNC C2002-120373
TI **Plasma** processing method used in, e.g., semiconductor manufacture, involves applying high-frequency power to antenna, while interior of vacuum chamber is maintained at specified pressure.
DC L03 M13 V05
IN KAI, T; MAEGAWA, Y; MATSUDA, I; OKUMURA, T
PA (MATU) MATSUSHITA DENKI SANGYO KK; (KAIT-I) KAI T; (MAEG-I) MAEGAWA Y; (MATS-I) MATSUDA I; (OKUM-I) OKUMURA T
CYC 2
PI US 2002038791 A1 20020404 (200245)* 36p C23F001-02
JP 2002203843 A 20020719 (200262) 19p H01L021-3065
ADT US 2002038791 A1 US 2001-968810 20011003; JP 2002203843 A JP 2001-306144 20011002
PRAI JP 2001-105442 20010404; JP 2000-303334 20001003
IC ICM C23F001-02; H01L021-3065
ICS B01J019-08; C23C014-00; C23C016-00; H05H001-46
AB US2002038791 A UPAB: 20020717
NOVELTY - A **plasma** processing method involves applying a high-frequency power at 100 kHz to 3 GHz to an antenna. This application of power is carried out, while interior of a vacuum chamber is maintained

to a specified pressure by **introducing** a specified **gas** into the vacuum chamber and simultaneously performing exhaustion.

DETAILED DESCRIPTION - A **plasma** processing method for generating **plasma** within a grounded vacuum chamber (1) and processing a substrate (7) placed on a substrate electrode (6) within the vacuum chamber, involves processing the substrate under a condition that **plasma** has not reached the region on the side on which the substrate is absent. The **plasma** is generated by applying a high frequency power having a frequency of 100 kHz to 3 GHz to an antenna (5) provided opposite to the substrate while interior of the vacuum chamber is **controlled** to a pressure by **supplying** a **gas** into the vacuum chamber and simultaneously exhausting the interior of the vacuum chamber. The method is carried out in a state that the vacuum chamber is separated into a region on one side on which the substrate is present and a region on the other side on which the substrate is absent by layers of porous conductor which are grounded at nearly all of their outer peripheral portions.

An INDEPENDENT CLAIM is also included for a **plasma** processing **apparatus** comprising (a) a **gas supply** unit (2) for **supplying gas** into a grounded vacuum chamber, (b) an exhausting unit for exhausting interior of the vacuum chamber, (c) a pressure-regulating valve (17) for **controlling** the interior of the vacuum chamber to a pressure, (d) a substrate electrode on which a substrate is placed within the vacuum chamber, (e) an antenna provided opposite to the substrate electrode, (e) high-frequency power supply (4) capable of supplying a high-frequency power having a frequency of 100 kHz to 3 GHz to the antenna, and (f) layer of porous conductor which are grounded at nearly all of their outer peripheral portions and arranged so that the vacuum chamber is separated into a region on the other side on which the substrate is absent by the layers of porous conductor.

USE - In the manufacture of semiconductors or other electronic devices and micromachines.

ADVANTAGE - The invention is less liable to occurrence of **plasma** spread to the region downstream of the substrate electrode, good at power efficiency, and capable of reducing the maintenance work.

DESCRIPTION OF DRAWING(S) - The figure shows a sectional view of the construction of a **plasma** processing **apparatus**.

Vacuum chamber 1
Gas supply unit 2
Turbo-molecular pump 3
Power supply 4
Antenna 5
Substrate electrode 6
Substrate 7
Exhausting port 16
Pressure-regulating valve 17
Inner chamber-forming structure 18
Dwg.1/21

TECH US 2002038791 A1UPTX: 20020717

TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred Components: The **apparatus** further includes a turbo-molecular **pump** (3) for **exhausting** the vacuum chamber, and an exhaust port (16) to the turbo-molecular pump. The pressure-regulating valve for **controlling** the vacuum chamber to the pressure is an up-and-down valve placed directly under the substrate electrode and just over the turbo-molecular pump. An inner wall surface of the vacuum chamber is covered with an inner chamber-forming structure (18). When a hole pitch of the porous conductor is p, a frequency of the high-frequency power to be applied to the antenna is f, and a light velocity is c, a relational

expression of (p is less than the product of 0.002 and the ratio of c/f).
Preferred Frequency: The frequency of the high-frequency power applied to the antenna is at 50 MHz to 3 GHz.
Preferred Dimension: The distance between the layers of porous conductor is at 3-20 mm. The porosity per unit area of the layers of porous conductor is not less than 50% each.
FS CPI EPI
FA AB; GI
MC CPI: L04-D04; M13-G01; M13-G02
EPI: V05-L09

L164 ANSWER 2 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 2002-328104 [36] WPIX
CR 2000-320224 [26]
DNN N2002-257374 DNC C2002-094734
TI Microwave applicator for use in **plasma** processing **apparatus,** includes circular waveguide provided with slots having centers which are offset parallel to the surface with respect to center of the circular waveguide.
DC A85 L03 P55 U11 V05 X24 X25
IN SUZUKI, N; YOKOSHIMA, S
PA (CANO) CANON KK; (SUZU-I) SUZUKI N; (YOKO-I) YOKOSHIMA S
CYC 2
PI US 2001054605 A1 20011227 (200236)* 38p B23K010-00
JP 2001345312 A 20011214 (200236) 20p H01L021-3065
ADT US 2001054605 A1 CIP of US 1999-426774 19991026, US 2001-816359 20010326; JP 2001345312 A JP 2001-97001 20010329
PRAI JP 2000-91709 20000329; JP 1998-308836 19981029; JP 1999-190400 19990705
IC ICM B23K010-00; H01L021-3065
ICS B01J019-08; C23C016-511; H01L021-205; H01L021-31; H05B006-66; H05H001-46
AB US2001054605 A UPAB: 20020610
NOVELTY - A microwave applicator (3) comprises a circular waveguide (13) having a surface provided with slots (33) for radiating microwaves. The centers of the slots are offset in a direction parallel to the surface with respect to the center of the circular waveguide.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:
(A) a **plasma** processing **apparatus** comprising an internally evacuatable container (1), a **gas supply** port for **supplying** a processing **gas** into the container, for applying **plasma** processing to an article arranged in the container, and a microwave applicator for applying a microwave energy for generating a **plasma** of the gas in the container; and
(B) a **plasma** processing method of **plasma** processing an article, comprising using the **plasma** processing **apparatus**.
USE - For use in a **plasma** processing **apparatus** for applying microwave energy.
ADVANTAGE - The microwave applicator accurately **controls** the microwave radiation characteristics in radial direction of the ring.
DESCRIPTION OF DRAWING(S) - The figure shows a schematic sectional view of a **plasma** processing **apparatus**.
Container 1
Microwave applicator 3
Dielectric window 4
Circular waveguide 13
Exhaust pump 18
Slots 33
Dwg.16A/20

TECH US 2001054605 A1UPTX: 20020610
TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred Component: The circular waveguide is an endless circular waveguide, and the circumferential length of the length of the endless circular waveguide is an integer having guide wavelength of microwaves. The length of the slots is one quarter-3/8 of the guide wavelength of microwaves. Microwaves of TE10 mode are introduced to the circular waveguide.
The surfaces is an H-plane of the circular waveguide. The slots are arranged at an interval of one half or one quarter of the waveguide of microwaves. The surface is provided with a dielectric member which covers the slots. The processing gas is emitted from the **gas supply** port to the surface.
An **exhaust pump** (18) reduces the pressure inside the container to at most1.34x103 Pa.
The centers of the slots are on a circle having a radius rc approximately represented by rc = n1lambda/(2 tan (pi/(2ng)))(1+cos (pi/ng)), where n1 is the number of antinodes of surface standing waves generated between the slots, preferably 3, 5, or 7; lambda is the wavelength of surface waves; ng is the ratio of the circumferential length lg of the circular waveguides to the guide wavelength lambdag, preferably 2-5. The angular spacing of the slots is pi/ng. The microwave applicator supplies microwaves into the container through a dielectric window (4).
Preferred Method: The **plasma** processing method can be ashing, etching, cleaning, chemical vapor deposition (CVD), **plasma** polymerization, doping, oxidation, or nitridation.
The method effects film formation on the article by the CVD. A 200 mm wafer is ashed with the circumferential length of the circular waveguide of 2 or 3 times the guide waveguide of microwaves.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Material: The dielectric window comprises aluminum nitride as a main component.
FS CPI EPI GMPI
FA AB; GI
MC CPI: A10-E01; A11-C04E; L03-G02; L03-H04D
EPI: U11-C09C; V05-F04L; V05-F05C1A; V05-F05E3; X24-D05; X25-B02B
PLE UPA 20020610
[1.1] 018; P0000; L9999 L2506-R; L9999 L2619 L2506; L9999 L2391; L9999 L2802; L9999 L2437-R; L9999 L2835; L9999 L2142; M9999 M2142; M9999 M2437-R; M9999 M2835; M9999 M2802; K9427; K9881 K9347 K9790
[1.2] 018; ND05; B9999 B5403-R B5276; N9999 N7023-R; N9999 N7034-R N7023; J9999 J2915-R; J9999 J2904; K9416; K9427; K9881 K9347 K9790; N9999 N7181 N7023; B9999 B5469 B5403 B5276

L164 ANSWER 3 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 2001-412408 [44] WPIX
DNN N2001-305061 DNC C2001-125050
TI **Plasma** processing **apparatus** for silicon substrate in semiconductor device manufacture **controls** valves through which vacuum pump and **gas supply** unit are coupled to nozzles to change flow direction of gas.
DC L03 U11 V05 X14
PA (MATU) MATSUSHITA DENKI SANGYO KK
CYC 1
PI JP 2001085414 A 20010330 (200144)* 12p H01L021-3065
ADT JP 2001085414 A JP 1999-262980 19990917
PRAI JP 1999-262980 19990917
IC ICM H01L021-3065
ICS C23F004-00; H05H001-46
AB JP2001085414 A UPAB: 20010809

NOVELTY - Several nozzles (9) are arranged radially around the discharge space between vertical electrodes. The nozzles are connected with vacuum **pump** (13) for **exhaust** gas, through valve (VB) and **gas supply** unit (11) through valve (VA). By **controlling** opening-closing of valves (VA,VB), **gas supply** position and exhaust position are changed for changing flow direction of **gas** from **nozzles** for **plasma** generation in discharge space.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for **plasma** processing method.

USE - **Plasma** processing during etching of silicon substrate used in semiconductor device manufacture.

ADVANTAGE - **Plasma** processing efficiency is improved, since gas for **plasma** generation is introduced uniformly by changing the direction of flow of gas for **plasma** generation even for various **plasma** processing conditions.

DESCRIPTION OF DRAWING(S) - The figure shows the top view of the **plasma** processing **apparatus**. (The drawing includes non-English language text).

Nozzles 9
Gas supply apparatus 11
Vacuum pump 13
Valves VA,VB
Dwg.2/10

FS CPI EPI
FA AB; GI
MC CPI: L03-H04D; L04-C07B; L04-D04
EPI: U11-C07A1; V05-F04E; V05-F05C; V05-F08E1; X14-F02

L164 ANSWER 4 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 2001-331583 [35] WPIX
DNN N2001-238852 DNC C2001-102384
TI **Plasma** processing **apparatus** has vacuum **pump** to **exhaust** hydrogen gas used for etching process outside the etching chamber.
DC L03 U11 V05 X14
PA (HITA) HITACHI LTD
CYC 1
PI JP 2001057362 A 20010227 (200135)* 5p H01L021-3065
ADT JP 2001057362 A JP 1999-232131 19990819
PRAI JP 1999-232131 19990819
IC ICM H01L021-3065
ICS B01J019-08
AB JP2001057362 A UPAB: 20010625

NOVELTY - The **apparatus** is equipped with a **plasma** generator, etching chamber (4), **gas supply** system (13) **supplying gas** to etching chamber, sample stand (9) holding the wafer (10), RF electric power supply unit and evacuation **apparatus**. Hydrogen gas used for etching process is exhausted outside the etching chamber by a high vacuum pump (8).

USE - Etching organic insulating film in semiconductor wafer.

ADVANTAGE - Enables to exhaust hydrogen gas used for etching process efficiently and to **control** the pressure inside the etching chamber.

DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of **plasma** processing **apparatus**. (Drawing includes non-English language text).

Etching chamber 4
Pump 8
Sample stand 9

Wafer(13) **Gas supply** system 10
Dwg.1/3
FS CPI EPI
FA AB; GI
MC CPI: L03-H04D; L04-C07D; L04-C12; L04-D04
EPI: U11-C07A1; V05-F05C; V05-F08E1; X14-F02

L164 ANSWER 5 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 2000-199530 [18] WPIX
DNN N2000-148304 DNC C2000-061632
TI **Plasma** chemical vapor deposition method for film formation on photoreceptors, semiconductor devices, thin film transistor, etc - involves **controlling** pressure in reactor by interlocking opening of exhaust throttle valve with changing revolutions of mechanical booster **pump** connected to **exhaust** outlet..
DC L03 M13 P84 U11
PA (CANO) CANON KK
CYC 1
PI JP 11350147 A 19991221 (200018)* 12p C23C016-50
ADT JP 11350147 A JP 1998-170636 19980603
PRAI JP 1998-170636 19980603
IC ICM C23C016-50
ICS C23C016-44; G03G005-08; H01L021-205
AB JP 11350147 A UPAB: 20000412
NOVELTY - **Plasma** chemical vapor deposition method involves forming thin films on rotating support acting as discharge electrode in reactor whose walls acts as other electrode on **pass**ing radio frequency power. The pressure inside the reactor is **controlled** within +7 to -7% of preset pressure by interlocking the opening of exhaust throttle valve with the changing rpms of mechanical booster **pump** connected to **exhaust**.

DETAILED DESCRIPTION - **Plasma** chemical vapor deposition (CVD) method involves forming a thin amorphous film on a rotating support heating raw material and serving as discharge electrode in a reactor whose walls act as the other electrode. On passing a gas through pipes provided along the longitudinal direction of the support, and impressing radio frequency (RF) power on the electrodes, thin film is formed on the support. The pressure inside the reactor is **controlled** within +7% to -7% of predetermined pressure by interlocking the opening of exhaust throttle valve with the changing rpms of mechanical booster **pump** connected to **exhaust**. An INDEPENDENT CLAIM is also included for the **plasma** chemical vapor deposition **apparatus** which consists of a cylindrical reactor whose inner walls acts as electrode. A rotating cylindrical support serves both as heater for raw material and as discharge electrode. Raw material **gas introduction** pipes are provided along the longitudinal direction of support. A radio frequency (RF) power supply is provided for exciting the raw material. A mechanical booster pump is connected to the reactor exhaust and a throttle valve is provided between the reactor and pump.

USE - For forming films on photoreceptors, semiconductor devices, thin film transistors (TFT), etc.

ADVANTAGE - The pressure in the reactor **can be controlled** stably within a specific range, by interlocking the opening of exhaust with the changing rpms of **pump** connected to **exhaust** outlet. By **controlling** the internal pressure of reactor, reproducibility and raising of electrophotographic characteristics of deposited film such as sensitivity, optical memory is obtained. By **controlling** internal pressure of reactor, film debonding can be prevented.

DESCRIPTION OF DRAWING - The figure shows the explanatory drawing of throttle valve used in **plasma** chemical vapor deposition **apparatus**.
Dwg.3/5
FS CPI EPI GMPI
FA AB; GI
MC CPI: L04-C01B; M13-E
EPI: U11-C01B

L164 ANSWER 6 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 2000-187718 [17] WPIX
DNN N2000-139227 DNC C2000-058660
TI Exhaust gas device of **plasma** CVD **apparatus** for semiconductor devices, has cooling pipe provided in exhaust gas line to liquefy diffusion **pump** oil **exhausted** along with exhaust gas of reactor.
DC J01 L03 M13 P84 U11
IN HASHIZUME, J; OKAMURA, R; UEDA, S
PA (CANO) CANON KK; (HASH-I) HASHIZUME J; (OKAM-I) OKAMURA R; (UEDA-I) UEDA S
CYC 2
PI JP 2000031074 A 20000128 (200017)* 16p H01L021-205
US 6203618 B1 20010320 (200118) C23C016-00
US 2001007174 A1 20010712 (200143) C23C016-00
ADT JP 2000031074 A JP 1999-80054 19990324; US 6203618 B1 US 1999-277815 19990329; US 2001007174 A1 Div ex US 1999-277815 19990329, US 2001-771715 20010130
FDT US 2001007174 A1 Div ex US 6203618
PRAI JP 1998-103766 19980331
IC ICM C23C016-00; H01L021-205
ICS C23C014-34; C23C016-44; C23C016-50; G03G005-00; G03G005-08; H01L021-3065; H01L021-31
AB JP2000031074 A UPAB: 20000405
NOVELTY - The device has a cooling pipe (105) in an exhaust gas line (104) provided between a diffusion pump (102) and an auxiliary pump (103), to liquefy diffusion **pump** oil **exhausted** along with an exhaust gas. Liquefied oil collected in an oil reservoir is ejected, when a valve between the oil reservoir and the exhaust gas line is closed.
DETAILED DESCRIPTION - The diffusion **pump exhausts** the inside of a reactor (101) of **plasma** CVD **apparatus**. The reactor is provided with a pipe for **introduction** of reaction **gas**. The cooling pipe is provided to the inner wall of the exhaust gas line or to the periphery of the exhaust gas line. The cooling pipe through which a coolant flows is spirally provided to the exhaust gas line. The exhaust gas line has a threshold portion (109) at the vicinity of the auxiliary pump. The oil reservoir connected to the exhaust gas line has a switching valve, an oil exhaust valve, a leak valve and evacuation valve. The switching valve is provided between the oil reservoir and the exhaust gas line. Lamp black in the diffusion oil which has been exhausted along with the exhaust gas of the reactor is liquefied in the exhaust gas line, due to the cooling provided in the exhaust gas line. The switching valve is opened and the oil exhaust valve of the oil reservoir is closed and liquefied diffusion pump oil is collected in the reservoir, from the exhaust gas line. The switching valve is closed and oil exhaust valve is opened so that liquefied oil is ejected out and recycled to the diffusion pump. An oil receptacle is provided to pass oil to the diffusion pump. The opening-closing valve is provided between the oil receptacle and the exhaust gas line. The oil receptacle is maintained in an airtight vacuum state, and it has an evacuation valve. The pressure inside the reactor is 10 mPa or more and 15 Pa or less. The reactor is used for deposition of a film on a base material accommodated in a container. The reactor may also

be used for sputtering process executed under vacuum or for etching processes. The exhaust gas is finally **exhausted** by the auxiliary **pump**. INDEPENDENT CLAIMS are also included for the following: (i) Exhaust gas method; (ii) Film deposition; (iii) Film deposition **apparatus**. The threshold portion in the exhaust gas line is provided such that liquefied oil in exhaust gas does not flows to the auxiliary **pump**. Similarly, since the **exhaust** gas line is connected to the lower portion of the diffusion pump and to the top portion of the auxiliary pump, the liquefied oil in the exhaust gas does not flow into the auxiliary pump. Both the pumps used are vacuum pumps. The base material is processed to be used in electrophotographic photoreceptors.

USE - For **plasma** CVD **apparatus** to form photoreceptor device, line sensors for image input, image pick-up device, photovoltaic device, etc and for sputtering **apparatus** to form insulated films for optical elements, metal wiring, etc, and for etching **apparatus**.

ADVANTAGE - Since the lamp black in the diffusion pump oil is liquefied in the exhaust gas line, the oil flow to the auxiliary pump is prevented. Even when raw material gas of a large rate of flow is exhausted, the oil in the diffusion pump is not reduced abruptly, therefore the pump maintenance is reduced. The film formed in the reactor is free form contamination and has excellent reproducibility. The manufacturing time is less. The deposited film has good quality. Film thickness **control** is easy. The exhaust gas device and the exhaust method are economical. Since the diffusion pump oil is prevented from flowing to the auxiliary pump, the abrasion of the auxiliary pump is prevented and hence the maintenance cost for the auxiliary pump is reduced. DESCRIPTION OF DRAWING - The figure shows the model diagram of deposition film forming **apparatus**. (101) Reactor; ; (102) Diffusion pump; ; (103) Auxiliary **pump**; ; (104) **Exhaust** gas line; ; (105) Cooling pipe; ; (109) Threshold portion.
Dwg.1/14

FS CPI EPI GMPI
FA AB; GI
MC CPI: L04-C01B; L04-D04; L04-D10; M13-F
EPI: U11-C01B; U11-C07A1

L164 ANSWER 7 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 2000-001633 [01] WPIX
DNN N2000-001395 DNC C2000-000485
TI Stripping of deposits, especially silicon deposits, from the interior surface of a **plasma**-enhanced CVD reactor used for processing electronic and electrical devices.
DC L03 U11 V05
IN GROUSSET, P; SCHMITT, J; TURLOT, E
PA (BALV) BALZERS HOCHVAKUUM AG; (UNAX-N) UNAXIS TRADING AG
CYC 7

PI	FR 2777913	A1	19991029	(200001)*	37p	C23C016-50
	~~DE 19919384~~	~~A1~~	~~19991125~~	~~(200002)~~		~~C23F004-00~~
	GB 2339553	A	20000202	(200008)		H01L021-3065
	JP 11354512	A	19991224	(200011)	12p	H01L021-3065
	US 6127271	A	20001003	(200050)		E03C001-244
	KR 99083571	A	19991125	(200055)		H01L021-306
	GB 2339553	B	20020109	(200206)		H01L021-3065
	TW 447006	A	20010721	(200219)		H01L021-00

ADT FR 2777913 A1 FR 1999-5375 19990428; DE 19919384 A1 DE 1999-19919384 19990428; GB 2339553 A GB 1999-9805 19990428; JP 11354512 A JP 1999-120190 19990427; US 6127271 A US 1998-66978 19980428; KR 99083571 A KR 1999-15266 19990428; GB 2339553 B GB 1999-9805 19990428; TW 447006 A TW 1998-108516

19980601
PRAI US 1998-66978 19980428
IC ICM C23C016-50; C23F004-00; E03C001-244; H01L021-00; H01L021-306; H01L021-3065
ICS B44C001-22; C03C025-06; C23C016-02; C23C016-54; C23F001-12; H01J037-32; H01J037-36
ICA H05H001-46
AB FR 2777913 A UPAB: 20000105

NOVELTY - The delivery rate of the stripping gas during the stripping process is reduced during the stripping process. **Control** of the reduction in the gas delivery rate is achieved by monitoring an element of the gas discharged from the reactor, in order to reduce the amount of stripping gas required and to decrease the atmospheric lifetime of the discharged gas.

DETAILED DESCRIPTION - Dry stripping of the interior surface of a reactor under vacuum involves:

(a) evacuating the reactor;

(b) generating a luminescent discharge in the interior of the reactor;

(c) **introducing** a reactive stripping **gas** into the interior of the reactor, and reacting the gas with the surface; and

(d) removing the gas together with the stripped products from the reactor.

The process also includes a stage of establishing an initial delivery rate of the stripping gas into the reactor, and reduction of the delivery rate after a predetermined time and during the reaction between the gas and the surface.

The stripping gas comprises a mixture of SF4, as a main component, and, preferably, oxygen.

Deposits based on silicon, carbon, refractory metals and, especially, silicon are removed.

An INDEPENDENT CLAIM is given for the vacuum treatment reactor (1). It comprises: a **pump** (11); a luminescence **discharge** generator (5); a gas inlet joined to a stripping gas reservoir (7) via a delivery rate **control** device (9); and a **control** unit (13, 15, 17, 19, 20) whose output is operationally joined to the **control** inlet of the gas delivery rate **control** device (9), and which generates an output signal to decrease the gas delivery rate to the reactor (1) for a predetermined time during a predetermined dry stripping cycle; and a wet cleaning unit below the reactor.

USE - Removal of deposits from a **plasma**-enhanced CVD reactor or group of such reactors used for the manufacture of electronic, electrical, optical and opto-electronic components.

ADVANTAGE - The amount of gas necessary for a stripping cycle can be markedly reduced. The atmospheric lifetime of the stripping gas is reduced significantly since the reactor is kept under vacuum.

DESCRIPTION OF DRAWING(S) - The drawing shows the reactor for treatment under vacuum.

Reactor 1

Luminescence discharge generator 5

Stripping gas reservoir 7

Stripping gas delivery rate **control** device 9

Pump 11

Control unit 13, 15, 17, 19, 20

Dwg.5/9

TECH FR 2777913 A1 UPTX: 20000105

TECHNOLOGY FOCUS - **INSTRUMENTATION** AND TESTING - The process also includes monitoring of at least one element of the gas removed from the reactor, and **control** of the reduction in gas delivery rate as a function of the monitored element.

FS CPI EPI
FA AB; GI
MC CPI: L04-C07B; L04-D01
EPI: U11-C07A1; V05-F05C; V05-F05E5A; V05-F08D1; V05-F08E
DRN 1666-U; 1669-U

L164 ANSWER 8 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1999-385328 [32] WPIX
DNN N1999-288607 DNC C1999-113309
TI Efficient recovery of rare gas from exhaust gas including xenon discharged from **equipment**, useful in electronic industry e.g. with **plasma** sputtering, **plasma** chemical vapor deposition and active ion etching **equipment**.
DC E36 E37 J01 L03 U11
IN ISHIHARA, Y; OHMI, T
PA (NIIO) NIPPON SANSO CORP; (OHMI-I) OHMI T; (OMIT-I) OMI T
CYC 21
PI WO 9928023 A1 19990610 (199932)* JA 30p B01J003-02
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: KR US
JP 11157814 A 19990615 (199934) 12p C01B023-00
EP 983791 A1 20000308 (200017) EN B01J003-02
R: BE DE FR GB IT NL
US 6217633 B1 20010417 (200123) B01D053-04
KR 2000070456 A 20001125 (200131) B01J003-02
ADT WO 9928023 A1 WO 1998-JP5335 19981127; JP 11157814 A JP 1997-330228 19971201; EP 983791 A1 EP 1998-955950 19981127, WO 1998-JP5335 19981127; US 6217633 B1 WO 1998-JP5335 19981127, US 1999-355556 19990730; KR 2000070456 A WO 1998-JP5335 19981127, KR 1999-706693 19990724
FDT EP 983791 A1 Based on WO 9928023; US 6217633 B1 Based on WO 9928023; KR 2000070456 A Based on WO 9928023
PRAI JP 1997-330228 19971201
IC ICM B01D053-04; B01J003-02; C01B023-00
ICS B01D053-46; C23C016-50; C23F004-00; H01L021-203; H01L021-205; H01L021-285
AB WO 9928023 A UPAB: 19990813
NOVELTY - A method for recovering a rare gas is to reclaim the rare gas in an exhaust gas discharged from a rare gas-using **equipment** operated under vacuum, during which the **introduction** of exhaust **gas** into a recovery system is switched to/from the discharging of the same gas to an exhaust system according to the concentration of the impurity components in the exhaust gas.

DETAILED DESCRIPTION - A method for recovering a rare gas is to reclaim the rare gas in an exhaust gas discharged from a rare gas-using **equipment** operated under vacuum, during which the **introduction** of exhaust **gas** into a recovery system is switched to/from the discharging of the same gas to an exhaust system according to the concentration of the impurity components in the exhaust gas. INDEPENDENT CLAIMS are also included for:

(i) a similar method in which the **introduction** of exhaust **gas** into a recovery system is switched to/from the discharging of the gas to an exhaust system under a vacuum condition; and

(ii) a recovery **apparatus** in which the exhaust gas from an **equipment** is extracted with a first **exhaust** vacuum **pump** linked in series with a second vacuum **exhaust** **pump** through a reduced pressure line from its secondary side, and such line is provided with a switching device branched out to the recovery line which in turn is installed with a vacuum pump for recovery with a compressor to adjust pressure of the recovered gas from the pump for storage in a tank where impurity components are removed and the rare gas

is purified with a purifier equipped with a rare-**gas supply** line back to the original **equipment**.
USE - The method is applicable to recovery of rare gas including xenon, particularly in electronic industry e.g. with **plasma** sputtering, **plasma** chemical vapor deposition and active ion etching **equipment**.
ADVANTAGE - It is operated in a recycling fashion and is highly efficient.
DESCRIPTION OF DRAWING(S) - A rare-gas recovery **apparatus** for a sputtering **equipment**.
Purifier 9
gas supplier 10
compressor 38
buffer tank 39
pressure **control** unit 41
Dwg.1/5
TECH WO 9928023 A1 UPTX: 19990813
TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Recovery: The switching operation is carried out in accordance with the concentration of the impurity components in the exhaust gas and the operating conditions of the rare gas-using **equipment**. Preferred Process: Between the vacuum pump for recovery and compressor, a device is installed to remove harmful components in the recovered gas diverted from such vacuum pump. A detector is provided to determine concentration of impurity components, and the checked gas is recovered through an exhaust line **controlled** by a branched out switching means provided between the impurity detector and compressor. The storage tank is equipped with a pressure detector for **controlling** the required amount of rare **gas** for **introduction** through a rare-**gas supplement** device.
ABEX WO 9928023 A1 UPTX: 19990813
EXAMPLE - Xenon gas was recovered with the apparatus depicted in Figure. The purifier (9) was used, with permitted pressure of 10 kg/cm2 at flow-rate of 1 l/min., buffer tank (39) with internal volume of 15 l, permitted pressure of 10 kg/cm2, pressure-control unit (41) at pressure controlled at 1.5-9.5 kg/cm2,and compressor (38) at maximum applied pressure of 8 kg/cm2 and pressure resistance of 15 kg/cm2. The recovery was about 86% from a 1500 cc/10 secs. gas introduction.
KW [1] 3319-0-0-0 CL PRD; 4233-0-0-0 CL PRD; 1376-0-0-0 CL PRD; 98768-0-0-0 CL PRD
FS CPI EPI
FA AB; GI; DCN
MC CPI: E31-J; J01-E02; L04-X
EPI: U11-A12; U11-C15Q
CMC UPB 19990813
M3 *01* B036 B100 C810 M411 M424 M720 M740 M904 M905 N104 N164 N513 Q431 Q454
DCN: R03133-K; R03133-P
M3 *02* B010 C810 M411 M424 M720 M740 M904 M905 N104 N164 N513 Q431 Q454
DCN: R08207-K; R08207-P
M3 *03* B054 B100 C810 M411 M424 M720 M740 M904 M905 N104 N164 N513 Q431 Q454
DCN: R03134-K; R03134-P
M3 *04* B018 B100 C810 M411 M424 M720 M740 M904 M905 N104 N164 N513 Q431 Q454
DCN: R03186-K; R03186-P

L164 ANSWER 9 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1999-211255 [18] WPIX
DNN N1999-155850 DNC C1999-062371

TI Gas substitution in process chamber - involves **supplying**
replacement **gas** in **gas supply** piping after
evacuating nitrogen through by-pass piping connected to exhaust tube.
DC L03 U11
PA (KOKZ) KOKUSAI DENKI KK
CYC 1
PI JP 11050258 A 19990223 (199918)* 5p C23C016-44
ADT JP 11050258 A JP 1997-211628 19970806
PRAI JP 1997-211628 19970806
IC ICM C23C016-44
ICS C23C016-50; C23C016-54
ICA H01L021-205
AB JP 11050258 A UPAB: 19990511
NOVELTY - A bypass pipe (12) is connected between a supply piping (5) and an exhaust tube (2) for nitrogen from a process chamber (1). An output valve (6) and an input valve (8) in the supply pipe and an exhaust valve (3) in the exhaust tube are closed. The **gas** in the **supply** pipe is **exhausted** by a vacuum **pump** (4) provided in the exhaust tube. DETAILED DESCRIPTION - A **controller** (9) **controls** a bypass valve (13) in the exhaust gas piping. The vacuum **pump exhaust** through the **exhaust** tube from the process chamber under normal operation. The **gas supply** piping is evacuated to the bypass piping before replacing processed object in the process chamber.
USE - Used in **plasma** chemical vapor deposition **apparatus** to prevent airflow between wafers in reaction tube.
ADVANTAGE - Prevents rise of particles from residual **gas** remaining in **supply** piping. DESCRIPTION OF DRAWING(S) - The drawing shows the block diagram of processing **apparatus** used for gas substitution. (1) Process chamber; (2) Exhaust tube; (3) **Exhaust** valve; (4) Vacuum **pump**; (5) Supply piping; (6) Output valve; (8) Input valve; (9) **Controller**; (12) Bypass pipe; (13) Bypass valve.
Dwg.1/4
FS CPI EPI
FA AB; GI
MC CPI: L04-C01B; L04-D01
EPI: U11-C01B

L164 ANSWER 10 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1997-463404 [43] WPIX
DNN N1997-386108 DNC C1997-147652
TI Deposition of thin film - in which the space position of the flow of the thin film precursor particles and the substrate are relatively moved with part of the substrate irradiated with precursor particles.
DC L03 U11
PA (SONY) SONY CORP
CYC 1
PI JP 09213634 A 19970815 (199743)* 14p H01L021-203
ADT JP 09213634 A JP 1996-40440 19960202
PRAI JP 1996-40440 19960202
IC ICM H01L021-203
ICS C23C014-50; C30B029-38
AB JP 09213634 A UPAB: 19971030
The substrate is irradiated with thin film precursor particles grown by physical vapour phase epitaxy to deposit a thin film on the substrate. Where, the space position of the flow of the thin film precursor particles and the substrate are relatively moved with part of the substrate irradiated with the thin film precursor particles.
Also claimed are (i) a semiconductor is produced by relatively moving

the space position of the flow of the thin film precursor particles and the substrate with part of the substrate irradiated with the thin film precursor particles; and (ii) **apparatus** for depositing the thin film having: (a) a thin film precursor source for growing the thin film precursor particles; (b) a support for mounting the substrate; (c) a shielded plate interposed between the thin film precursor source and the support and having an opening for irradiating the thin film precursor particles at part of the substrate; and (d) a moving means for relatively moving the thin film precursor particles and the substrate.

ADVANTAGE - The thin film is deposited on part of the substrate. The result forms a **plasma** on a small space region to easily yield uniform **plasma** density or a desired **plasma** pattern.
The small-sized thin film precursor source or the small-sized **equipment** is available. Smaller chamber capacity is available, requiring no vacuum **pump** having high **exhaust** capability, and uniformly, easily **supplying** a **gas** in the chamber. The small depositing region deposits the thin film having uniform quality and film thickness in good **controllability** on the entire substrate.
Dwg.1/11

FS CPI EPI
FA AB; GI
MC CPI: L04-C01A; L04-D01
EPI: U11-C01A1; U11-C01B; U11-C01J2

L164 ANSWER 11 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1995-117206 [16] WPIX
DNN N1995-092489
TI **Control** of wafer temperature during **plasma** treatment - **controls** pressure inside etching treating chamber to etching treating pressure while etching is performed and uses process gas in reservoir to cool wafer, afterwards process gas is **exhausted** using vacuum **pump**.
DC U11 V05
IN EDAMURA, M; ITO, Y; SHICHIDA, H; TAMURA, N
PA (HITA) HITACHI LTD
CYC 4

PI	EP 644577	A1	19950322	(199516)*	EN	23p	H01L021-00
	R: DE GB IT						
	JP 07086247	A	19950331	(199522)		12p	H01L021-3065
	EP 644577	B1	19970910	(199741)	EN	27p	H01L021-00
	R: DE GB IT						
	DE 69405499	E	19971016	(199747)			H01L021-00

ADT EP 644577 A1 EP 1994-108878 19940609; JP 07086247 A JP 1993-230186 19930916; EP 644577 B1 EP 1994-108878 19940609; DE 69405499 E DE 1994-605499 19940609, EP 1994-108878 19940609
FDT DE 69405499 E Based on EP 644577
PRAI JP 1993-230186 19930916
REP 1.Jnl.Ref; EP 260150; EP 469469; EP 513834; US 5213349
IC ICM H01L021-3065
ICS H01L021-68
AB EP 644577 A UPAB: 19950502
The method electrostatically adheres a treated object to a specimen table after the treated object is mounted on the table in a gas environment of a treating system having pressure higher than the treating pressure. The pressure of the treating chamber (6) is **controlled** to a predetermined pressure.

The specimen table comprises an electrostatic adhering electrode with grooves on its surface and a hole for a pin for lifting up the specimen. The gas has a pressure which is higher than the treating pressure, and is

enclosed between the wafer (1) and the space that is formed by the grooves on the electrostatic adhering electrode and the gap between the pin to lift up the specimen and the hole.
ADVANTAGE - Allows for the wafer temperature to be easily performed and the structure of the electrode simplified.
Dwg.1/19

ABEQ EP 644577 B UPAB: 19971013
Apparatus for treating a wafer in a reduced pressure environment, the **apparatus** comprising a treatment chamber (6) which can be evacuated and **supplied** with a **gaseous** medium (11) suitable for wafer treatment; a pedestal (15) in the treatment chamber (6) for receiving the wafer to be treated, the pedestal (15) forming an electrode and having on its upper surface in opposed relationship to the positioned wafer (1) an electrostatic adhering electrode (21) which is constructed by means of forming an insulating film (20) on an electrode (19); and the pedestal having a spatial reservoir (27, 28, 29) which has in the rest position when the wafer (1) is not positioned equal pressure with the treatment chamber (6), characterised by - means (2, 7) for transferring the wafer (1) from a load cassette (3) passed the treatment chamber (6) to an unload cassette (9); means for maintaining a process gas (11) in the treatment chamber (6) at a pressure higher than a pressure for treating the wafer; means for filling the spatial reservoir (27, 28, 29) with a process gas (11) having a pressure higher than the pressure for treating the wafer when the wafer (1) is electrostatically adhered to the electrode (21), and for maintaining the process gas (11) in the treatment chamber (6) at a pressure higher than the pressure for treating the wafer; and means for depressurising the pressure in the treatment chamber (6) to the pressure for treating the wafer; wherein, when the wafer (1) is positioned and electrostatically adhered to the electrostatic adhering electrode (21), the spatial reservoir (27, 28, 29) is sealed at one end to the treatment chamber (6) by means of an O-ring (31) and at the other end by means of the wafer (1) which is electrostatically adhered to the electrode (21), so that the gas contained in the spatial reservoir (27, 28, 29) substantially maintains its pressure while the treatment chamber (6) is further evacuated to lower pressure required for the wafer treatment, the gas contained in the spatial reservoir (27, 28, 29) serving as heat transfer medium between the wafer (1) and the pedestal (15).
Dwg.1/19

FS EPI
FA AB; GI
MC EPI: U11-C07A1; U11-C09C; U11-F02A2; V05-F04G; V05-F05C1A; V05-F05C3; V05-F08E1

L164 ANSWER 12 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1994-051951 [07] WPIX
CR 1994-051949 [07]; 1994-051950 [07]
DNN N1995-053593
TI **Plasma** processing **appts**. etching tunnel-type for semiconductor wafers - has etching tunnel arranged between heater and processing **gas introducing** region and includes several holes through which radicals pass..
DC U11 V05 X14
IN AOKI, K; KAKIZAKI, J; KATO, H; MORI, H; SHIMADA, Y; SHIOTSUKI, T
PA (TKEL) TOKYO ELECTRON LTD; (TKEL) TOKYO ELECTRON TOHOKU KK; (TOKE) TOSHIBA KK
CYC 2
PI JP 06005554 A 19940114 (199407)* 6p H01L021-302
US 5383984 A 19950124 (199510)B 12p H01L021-00
ADT JP 06005554 A JP 1992-183218 19920617; US 5383984 A US 1993-77602 19930617

PRAI JP 1992-183216 19920617; JP 1992-183217 19920617; JP 1992-183218
19920617
IC ICM H01L021-302
ICS H01L021-027
AB US 5383984 A UPAB: 19950314 ABEQ treated as Basic
The substrate processing **appts**. comprises a process tube for enclosing a number of semiconductor wafers, **injectors** for **introducing** process **gas** into the process tube, and a vacuum **pump** for **exhausting** the process tube. RF electrodes are arranged along the outer circumference of the process tube and serves to generate high frequency electric field, when power is **supplied**, in a process-**gas-introduced** region so as to make process gas into **plasmas**.

A high frequency power source supplies power to the RF electrodes. Heaters are arranged in the process tube to directly heat the wafers. A power supply supplies power to the heaters, and a **controller** for regulates the amount of power supplied from the power supply to the heaters.

ADVANTAGE - Increases throughput of substrates.
Dwg.1/13
AB JP 06005554 A UPAB: 19950322
Dwg.2/4
Dwg.2/4
FS EPI
FA AB; GI
MC EPI: U11-C04A1D; U11-C07A1; U11-C09C; V05-F04D3; V05-F05C1; V05-F05E3;
V05-F08E1; X14-F02; U11-C03A; V05-F04X; V05-F05E5

L164 ANSWER 13 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1994-051950 [07] WPIX
CR 1994-051949 [07]; 1994-051951 [07]
DNN N1995-053593
TI **Plasma** processing **appts**. etching tunnel-type for semiconductor wafers - has etching tunnel arranged between heater and processing **gas introducing** region and includes several holes through which radicals pass..
DC U11 V05 X14
IN AOKI, K; KAKIZAKI, J; KATO, H; MORI, H; SHIMADA, Y; SHIOTSUKI, T
PA (TKEL) TOKYO ELECTRON LTD; (TKEL) TOKYO ELECTRON TOHOKU KK; (TOKE) TOSHIBA KK
CYC 2
PI JP 06005553 A 19940114 (199407)* 5p H01L021-302
US 5383984 A 19950124 (199510)B 12p H01L021-00
ADT JP 06005553 A JP 1992-183217 19920617; US 5383984 A US 1993-77602 19930617
PRAI JP 1992-183216 19920617; JP 1992-183217 19920617; JP 1992-183218
19920617
IC ICM H01L021-302
ICS H01L021-027
AB US 5383984 A UPAB: 19950314 ABEQ treated as Basic
The substrate processing **appts**. comprises a process tube for enclosing a number of semiconductor wafers, **injectors** for **introducing** process **gas** into the process tube, and a vacuum **pump** for **exhausting** the process tube. RF electrodes are arranged along the outer circumference of the process tube and serves to generate high frequency electric field, when power is **supplied**, in a process-**gas-introduced** region so as to make process gas into **plasmas**.

A high frequency power source supplies power to the RF electrodes. Heaters are arranged in the process tube to directly heat the wafers. A power supply supplies power to the heaters, and a **controller** for

regulates the amount of power supplied from the power supply to the
heaters.
ADVANTAGE - Increases throughput of substrates.
Dwg.1/13
AB JP 06005553 A UPAB: 19950322
Dwg.2/6
Dwg.2/6
FS EPI
FA AB; GI
MC EPI: U11-C04A1D; U11-C07A1; U11-C09C; V05-F04B5; V05-F05C1; V05-F05E3;
V05-F08E1; X14-F02; U11-C03A; V05-F04X; V05-F05E5

L164 ANSWER 14 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1994-051949 [07] WPIX
CR 1994-051950 [07]; 1994-051951 [07]
DNN N1995-053593
TI **Plasma** processing **appts**. etching tunnel-type for
semiconductor wafers - has etching tunnel arranged between heater and
processing **gas introducing** region and includes several
holes through which radicals pass..
DC U11 V05 X14 X25
IN AOKI, K; KAKIZAKI, J; KATO, H; MORI, H; SHIMADA, Y; SHIOTSUKI, T
PA (TKEL) TOKYO ELECTRON LTD; (TKEL) TOKYO ELECTRON TOHOKU KK; (TOKE) TOSHIBA
KK
CYC 2
PI JP 06005552 A 19940114 (199407)* 6p H01L021-302
US 5383984 A 19950124 (199510)B 12p H01L021-00
ADT JP 06005552 A JP 1992-183216 19920617; US 5383984 A US 1993-77602 19930617
PRAI JP 1992-183216 19920617; JP 1992-183217 19920617; JP 1992-183218
19920617
IC ICM H01L021-302
ICS H01L021-027
AB US 5383984 A UPAB: 19950314 ABEQ treated as Basic
The substrate processing **appts**. comprises a process tube for
enclosing a number of semiconductor wafers, **injectors** for
introducing process **gas** into the process tube, and a
vacuum **pump** for **exhausting** the process tube. RF
electrodes are arranged along the outer circumference of the process tube
and serves to generate high frequency electric field, when power is
supplied, in a process-**gas-introduced** region
so as to make process gas into **plasmas**.
A high frequency power source supplies power to the RF electrodes.
Heaters are arranged in the process tube to directly heat the wafers. A
power supply supplies power to the heaters, and a **controller** for
regulates the amount of power supplied from the power supply to the
heaters.
ADVANTAGE - Increases throughput of substrates.
Dwg.1/13
AB JP 06005552 A UPAB: 19950322
Dwg.1/7
Dwg.1/7
FS EPI
FA AB; GI
MC EPI: U11-C03A; U11-C04A1D; U11-C07A1; U11-C09C; V05-F04X; V05-F05C1;
V05-F05E3; V05-F08E1; X14-F02; X25-B01D; V05-F05E5

L164 ANSWER 15 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1990-248033 [33] WPIX
DNN N1990-192646
TI Low-temperature **plasma** processing **appts**. for mfg.

semiconductor - has microwave cavity resonator coupled to gas chamber by slots propagating microwave power intensity of **one** watt per square cm..
DC P78 U11 V05 X14
IN AZUMA, J; OHARA, K; OHTSUBO, T; SASAKI, I; TOKUDA, M; USUAMI, H; YAMAGUCHI, Y
PA (HITA) HITACHI LTD
CYC 6

PI	EP 382065	A	19900816 (199033)*			
	R: DE FR GB					
	JP 02209484	A	19900820 (199039)			
	US 4985109	A	19910115 (199106)			
	KR 9305945	B1	19930629 (199425)			H01L021-30
	EP 382065	B1	19970521 (199725)	EN	27p	H01J037-32
	R: DE FR GB					
	DE 69030744	E	19970626 (199731)			H01J037-32

ADT EP 382065 A EP 1990-101864 19900131; JP 02209484 A JP 1989-27406 19890208; US 4985109 A US 1990-475889 19900206; KR 9305945 B1 KR 1990-1405 19900206; EP 382065 B1 EP 1990-101864 19900131; DE 69030744 E DE 1990-630744 19900131, EP 1990-101864 19900131
FDT DE 69030744 E Based on EP 382065
PRAI JP 1989-27406 19890208
REP 1.Jnl.Ref; A3...9129; EP 264913; EP 300447; NoSR.Pub
IC B44C001-22; C03C015-00; C03C025-06; C23C016-50; C23F004-00; H01J037-32; H01L021-20; H05H001-46
ICM H01J037-32; H01L021-30
ICS B44C001-22; C03C015-00; C03C025-06; C23C016-50; C23F004-00; H01L021-20; H05H001-46
AB EP 382065 A UPAB: 19930928

A circular microwave cavity resonator (1) resonating in E01 mode at 2450 MHz is separated from the **plasma** processing chamber (6) by the slotted coupling plate (5). The slots are arcuate each having a length of twenty-five to sixty five mm. and a width of five to twenty mm arranged on a circumference of a circle of between sixty and 350 mm in diameter. The area of the aperture provided by each slot is between five and 130 cms. Microwave power generated by a magnetron (3) is supplied through a waveguide (22) having an isolator (20) and stub **tuner** (21).

Processing gas is piped to the chamber (6) through a supply chamber (102) and blown off from a supply port (1020). Pressure in the chamber is **controlled** by a vacuum **exhaust pump** connected through a pipe (10). The wafer (12) for processing is supported on a stage (7) insulated (8) from a high frequency bias voltage supply (11). A refrigerant is supplied to the chamber from a chiller unit (15).

USE - For etching, CVD, ashing, etc.

1/16

ABEQ US 4985109 A UPAB: 19930928

The **plasma** processing **appts**. includes a microwave generator, a waveguide for supplying microwaves generated by the microwave generator, a cavity resonator for resonating the microwaves supplied by the waveguide, and a **plasma** processing chamber. The ~~**plasma** processing chamber is coupled to the cavity resonator for~~ receiving resonated microwave and for generating a **plasma**. The **plasma** processing chamber is provided with a stage for holding a substrate for **plasma** processing, and **appts**. for **introducing** a **plasma** processing **gas** to the **plasma** processing chamber for exhausting gas. A plate separates the cavity resonator and the **plasma** processing chamber and enables resonated microwaves to be transmitted therethrough from the cavity resonator means to the plsma processing chamber.

A slot plate functioning as an antenna is disposed in the cavity resonator in opposition to a surface of the substrate for enabling

radiation of the resonated microwaves to the **plasma** processing chamber through the separation plate, the slot plate including at least one set of circumferentially extending slots for enabling radiation of resonated microwaves.

USE - For processes e.g CVD, etching, ashing etc. used in semiconductor element mfr.

ABEQ EP 382065 B UPAB: 19970619

Plasma processing **apparatus** comprising microwave generator means (3) for generating microwaves, waveguide means (22) for supplying microwaves generated by the microwave generated by the microwave generator means (3), cavity resonator means (1) for resonating the microwaves supplied by the waveguide means (22), **plasma** processing chamber means (6) coupled to the cavity resonator means (1) for receiving microwaves therefrom and for generating a **plasma** therein, the **plasma** processing chamber means (6) having means (7) for holding a substrate (12) for **plasma** processing, means (9) for **introducing** a **plasma** processing **gas** to the **plasma** processing chamber (6), and means (10) for exhausting gas therefrom, separation plate means (4) for separating the cavity resonator means (1) and the **plasma** processing chamber means (6) and for enabling resonated microwaves to be transmitted therethrough from the cavity resonator means (1) to the **plasma** processing chamber means (6), slot plate means (5) disposed between the cavity resonator means 91) and the **plasma** processing chamber means (6) and facing a surface of the substrate (12) for enabling radiation of the resonated microwaves to the **plasma** processing chamber means (6) through the separation plate means (4), the slot plate means (5) including at least one set of circumferentially extending slots (5a) for enabling radiation of microwaves, characterized by further comprising

magnetic field means (100) located on the interface between the **plasma** processing chamber means (6) and the cavity resonator means (1) to produce a magnetic field (101) in the vicinity of said slots (5a) for efficiently accelerating the electrons by said microwaves radiated from said slots (5a).

Dwg.1/15

FS EPI GMPI
FA AB; GI
MC EPI: U11-C01B; U11-C07A1; U11-C09C; V05-F09; X14-F

L164 ANSWER 16 OF 16 WPIX (C) 2002 THOMSON DERWENT
AN 1990-173044 [23] WPIX
DNN N1990-134576 DNC C1990-075334
TI Improvements to dry solder reflow processes - comprise abstraction of oxygen from metal oxide using atomic hydrogen.
DC L03 M23 P55 P78 X24
IN PEDDER, D J; PICKERIN, K L; WORT, C J; PICKERING, K L
PA (PLES) PLESSEY OVERSEAS LTD; (MAON) GEC-MARCONI LTD
CYC 13
PI EP 371693 A 19900606 (199023)*
R: AT BE CH DE FR GB IT LI LU NL SE
JP 02190489 A 19900726 (199036)
US 5000819 A 19910319 (199114)
EP 371693 B1 19940209 (199406) EN 6p C23G005-00
R: AT BE CH DE FR GB IT LI LU NL SE
DE 68913013 E 19940324 (199413) C23G005-00
ADT EP 371693 A EP 1989-312159 19891122; JP 02190489 A JP 1989-312256 19891130; US 5000819 A US 1989-442797 19891129; EP 371693 B1 EP 1989-312159 19891122; DE 68913013 E DE 1989-613013 19891122, EP 1989-312159 19891122

FDT DE 68913013 E Based on EP 371693
PRAI GB 1988-27933 19881130
REP 1.Jnl.Ref; EP 157708; EP 69189; GB 2144669
IC B23K001-20; B44C001-22; C03C015-00; C03C025-06; C23F001-00; C23G005-00
AB EP 371693 A UPAB: 19930928
Improvements are claimed for dry solder reflow process in which surface metal oxides are removed from the solder surface by the abstraction of the oxygen from the metal oxide using atomic hydrogen, this atomic hydrogen being created within an intense microwave frequency **plasma** of a gas contg. hydrogen.

The **appts**. comprises a cylindrical fused silica vacuum chamber (1) **exhausted** by a rotary **pump**/oil diffusion pump combination (11,10). Within the chamber is an electrically heated platform (2) with a thermocouple for temp. monitoring and **control** . The platform may be moved up or down int he **chamber**. A conical section at the top of the chamber leads to a small tuneable microwave cavity (4) in which the **plasma** (5) may be generated by a 200W, 2.45 GGz microwave generator (6). An argon-hydrogen **gas** mixture (7) is **introduced** to the top of the microwave cavity (4), its flow rate being **controlled** by a precision **needle** valve. The **gas** flow sweeps atomic hydrogen species generated in the **plasma** (5) downwards to the solder coated sample chip (9) on the heated platform.

USE/ADVANTAGE - For the cleaning of metal **sur**faces in dry solder reflow processes which may be applied to flip-chip bonding for use in microelectronic applications. It avoids the need for stringent cleaning after bonding to remove potentially corrosive flux residues.
1/1

ABEQ US 5000819 A UPAB: 19930928
In a cleaning process for removal of surface metal oxides for a dry solder reflow process, e.g. for flip-chip solder bonding, the chip (9) is placed on a substrate heater platform (2) in a reaction vessel (1), which is evacuated prior to introduction of an atmos. contg. H2, e.g. H2/Ar, at a pressure of 10-100 m torr, while the sample is heated to a temp. below solder m.pt.. A **plasma** is then formed in the vessel by a microwave generator (6), tuned so that the H **plasma** occupies max. vol. in the reaction vessel above the platform. Heating is then continued to solder temp..

ADVANTAGE - Avoids residues.

ABEQ EP 371693 B UPAB: 19940322
A dry solder reflow process including a cleaning operation for the removal of surface metal oxides from solder surfaces of solder coated articles to be bonded by soldering, the process comprising positioning at least one solder coated article to be cleaned and dry soldered within a reaction chamber and heating the article, characterised by the steps of **introducing** a **gas** mixture containing hydrogen into a **plasma** generating microwave cavity, and using **plasma** excitation frequencies greater than 500MHz to produce atomic hydrogen so produced to flow into the reaction chamber for the abstraction of oxygen from the surface metal oxides of the article as the temperature of the article within the reaction chamber is raised to the solder reflow temperature.
Dwg.1/2

FS CPI EPI GMPI
FA AB; GI
MC CPI: L03-H04E6; L04-C17A; M23-A04
EPI: X24-A01